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ABSTRACT

This report describes the early development, recent revision, and some uses of a special Graduate Record Examinations (GRE) database for studying talent flow between undergraduate and graduate school. It discusses the following: (1) development and expansion of a talent flow database containing all variables from the GRE General Test files on all examinees between 1982 and 1993; (2) availability of the database to other researchers; (3) analyses of the database to highlight talent flow patterns; (4) designs of graphic displays that are useful to illustrate talent flow; and (5) suggestions for future uses of the database, including a new approach to studying test validity. This report contains summary statistics for all broad fields of study for each gender and for all ethnic groups and includes trends in the numbers and percentages of examinees planning graduate study in each area and the academic qualities of those examinees. Talent flow analyses indicated that the fields with the greatest holding power appear to coincide with the fields having the fewest examinees seeking a doctorate. This observation suggests that at a time of limited employment opportunities for Ph.D.s, students are attracted to fields that require only a master's degree and gravitate toward those fields for graduate study. Seven appendixes contain major field codes and categories, definitions, the dataset layout, and sample talent flow tables. (Contains 26 figures, 44 appendix tables, and 19 references. (SLD)

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Talent Flow from Undergraduate to Graduate School: 1982-1993

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Jerilee Grandy

December 1995

GRE Board Professional Report No. 92-02P
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Educational Testing Service, Princeton, New Jersey

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Talent Flow from Undergraduate to Graduate School: 1982-1993

Jerilee Grandy

GRE Board Report No. 92-02P

December 1995

This report presents the findings of a
research project funded by and carried
out under the auspices of the Graduate
Record Examinations Board.

Educational Testing Service, Princeton, NJ 08541

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Contents

Page

Introduction 1

Background 1

Overview 1
Studies of Talent Flow 2
GRE Talent Flow Database 3

Database Revision 4

Additional Years 4
Additional Variables 5
Additional Examinees 6
Recoding of Major Fields 7

Availability of the Revised Database 8

Research Questions 8

Analysis of the GRE Talent Flow Database for U. S. Citizens 9

Trends by Intended Area of Graduate Study 9

Areas of Study 9
Academic Qualities 11
Gender 15
Ethnic Group 18
Age 18
Degree Objectives 18
Undergraduate Composition 22

Changes in Field of Study 25

Differences between Examinees Who Change Fields and Those Who Do Not 30

Patterns of Change for Each Academic Area 31

Arts and Humanities 31
Mathematics, Physical Sciences, and Computer Sciences 34
Engineering 36
Biological Sciences 40
Social Sciences 43
Health Sciences and Services 46
Education 48
Business 51

Contents (continued)

Page

Use of the Database to Describe Specific Fields of Study 53

Graduate Field Selections of Psychology Majors 54
Undergraduate Programs of Examinees Planning to Enter Veterinary Medicine 56
Gender Balance of Biology Majors Choosing Specific Graduate Fields of Study 56

Further Use of the Database 59

References 61

Appendix A: Major Field Code List for 1987
Appendix B: Major Field Code List for 1989
Appendix C: Major Field Category Transformations, 1978-87
Appendix D: Major Field Category Transformations, 1988-93
Appendix E: Broad Major Field Definitions
Appendix F: Dataset Layout
Appendix G: Sample Talent Flow Tables

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The author is grateful to two lead data analysts who constructed the database and designed printouts of tables.

Nancy Robertson, who created and documented the earlier database, also constructed the revised version reported here. Because of her patience and persistence at a very lengthy and tedious task, she was able to turn 12 years' worth of GRE files into a well organized, standardized, and documented database that will be useful to researchers for many years to come.

Jennifer Nelson, with her talent for designing readable and attractive tables on the mainframe computer, constructed more than 1,000 pages of easy-to-read tables presenting numerous statistics on talent flow. Thanks to her thoughtful approach to the project, she can easily modify her programs for special applications to produce new tables with different variables and subgroups of examinees.

Finally, I am especially indebted to Maria Pennock-Román for her very careful and detailed line-by-line and number-by-number review of this manuscript, and to Kenneth Wilson for his many thoughtful suggestions.

Abstract

This report describes the early development, recent revision, and some uses of a special Graduate Record Examinations (GRE) database for studying talent flow between undergraduate and graduate school. More specifically, it discusses the following: (1) development and expansion of a talent flow data base containing all variables from the GRE General Test files on all examinees between 1982 and 1993; (2) availability of the database to other researchers; (3) analyses of the database to highlight talent flow patterns; (4) designs of graphic displays that are useful to illustrate talent flow; and (5) suggestions for future uses of the database, including a new approach to studying test validity.

Variables in the database include all questions asked on the GRE background questionnaire in addition to GRE scores. Those variables include undergraduate major, intended area of graduate study, gender, ethnicity, birth date, educational level, father's and mother's education, citizenship status, year of bachelor's degree, some institutional information, grade-point averages, undergraduate courses, honors and other achievements, activities, GRE scores, graduate degree objective, and an indicator of whether they changed majors from undergraduate to graduate school. The database was constructed so that its format and coding are as comparable as possible across all 12 years, in spite of radical changes made in the background questionnaire during that period. Several formats of the database are available to researchers upon request.

The report includes summary statistics for all broad fields of study--for each gender and all ethnic groups--including trends in the numbers and percentages of examinees planning graduate study in each area and the academic qualities of those examinees.

Talent-flow analyses examined the holding power of each broad field of study. Those fields with the greatest holding power appeared to coincide with the fields having the fewest number of examinees seeking a doctorate. This observation suggests that in a time when there are very limited employment opportunities for Ph.D.s, students are attracted to fields requiring only a master's degree, such as allied health professions, and will gravitate toward those fields for graduate school and away from fields such as humanities. For examinees changing fields, we were also able to identify fairly consistent patterns associating test scores with chosen field of graduate study. For example, education majors with relatively high verbal scores switch to humanities, and education majors with relatively high quantitative scores switch to physical sciences. Such patterns also suggest an entirely new way of looking at test validity.

Analyses are quite detailed, focusing on each broad field of study and some specific fields, and on each gender and ethnic group. Some graphic methods are developed to illustrate the complexities of talent flow. Finally, the report suggests other ways in which the database may be used by researchers.

Introduction

This report describes the early development, recent revision, and some of the uses of a special GRE database for studying talent flow between undergraduate and graduate school. More specifically, it discusses the following:

- development and expansion of a talent flowdata base, and its availability to other researchers
- analysis of the database to highlight talent flow patterns
- designs of graphic displays that are useful to illustrate talent flow
- suggestions for future uses of the database, including a new approach to studying test validity

Background

Overview

In a recently completed GRE project, Grandy and Robertson (1992) produced a special GRE database for studying talent flow. This set of files has provided easy and relatively inexpensive access to information especially relevant to talent flow from undergraduate to graduate school among all U.S. citizens taking the GRE General Test and specifying an intended field of graduate study. The database covers the 10-year period from 1978 to 1987 and includes all information thought to be important to the study of talent flow: undergraduate major field, mean test scores, grade-point averages, parents' education, age, and many other kinds of data that students provide on the GRE background questionnaire.[1]

To keep the file current, it should be extended every five years or so. In this project, we not only extended the database, but completely redesigned it to include all test takers (not just U.S. citizens), and essentially all variables in the GRE files. Most importantly, we recoded all major field designations to be as comparable as possible across all years, despite extensive changes that occurred in the wording and format of the background questionnaire. The revised database contains the anonymous records of all GRE test takers from 1982 through 1993.[2]

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[1] Throughout this report we have identified an academic year by the later half of that year. For example, 1981 data refers to the data collected during the academic year 1980-81.

[2] Because GRE history files earlier than 1982 were not retained, the new talent flow database does not contain records prior to 1982. The revised database, therefore, begins with 1982 and includes 12 consecutive years of data.

Studies of Talent Flow

In recent years, ETS has conducted a number of studies of talent flow using a variety of databases. A study by Hilton and Schrader (1987) entitled "Pathways to Graduate School" analyzed the National Longitudinal Study (NLS) database, beginning with high school seniors in 1972. This database now contains additional follow-up information collected in 1973, 1974, 1976, 1979, and 1986.

Subsequently, Hilton and Pollack (1989) received GRE funding to study talent flow in the 1980 High School and Beyond (HS&B) database. Their study, which compared the HS&B database with the National Longitudinal Study (NLS) database, showed substantial declines in the percentages of Black males who completed undergraduate school, and particularly in the percentages of high-ability Black males who did so. These declines were seen as troubling and are the subject of yet another study, this one funded by NSF and conducted by Hilton, Hsia, Solorzano, and Benton (1989). This longitudinal survey followed a sample of minority students who earned high mathematics scores on the Scholastic Aptitude Test (SAT) in 1984-85 and who intended to major in science or engineering to determine what environmental factors might be associated with persistence through the next five years. Grandy (1994a) is currently conducting a path analysis of the same data.

In response to a request from the National Science Foundation, Grandy produced a matched file containing the complete records of nearly half a million test takers who took the SAT between 1980 and 1986 and all GRE tests between 1985 and 1989. This is the largest matched SAT/GRE file ever created, containing information about students' undergraduate institutions as well as data about individual students. The NSF has used the data to predict the "effect" of institutional type on student outcomes, controlling on individual student data. This database is maintained by Educational Testing Service (ETS) for ongoing research.

One researcher currently examining this database is Pennock-Román. In a study funded by the NSF, she is conducting a longitudinal analysis of persistence in science majors. Her study differs from previous analyses in several ways. She has limited her investigation to students who are contemporary with participants in the 1980 High School and Beyond study. She has included resident aliens in her analyses, and she has added variables related to the undergraduate schools that they attended from the Annual Survey of Colleges. She has also used the choice of undergraduate major specified in the SAT file to study the transition from high school intention to actual undergraduate major.

In another study, funded by the Sloan Foundation, Pennock-Román is using the same database and addressing the same persistence issues. Rather than a descriptive study, however, she is developing a predictive model using logistic regression with random effects to evaluate the relative strength of student variables (such as test scores and math/science courses taken in high school) and university variables (such as level of competition, research status, and private versus public status) to predict persistence.

In August 1987, Kuh proposed a framework for the study of talent flow to graduate education (Kuh, 1987). She contended that an awareness of the supply of graduate-educated workers is important to government, to industry, and to academia. Among possible research studies she suggested the exploration of early indicators of interest in graduate school through a matched GRE-

SAT database, studies of the effects of labor market and noneconomic factors on choices of undergraduate and graduate major, and studies of both foreign talent flow and minority talent flow.

Since that time, the GRE Board has funded a number of talent flow studies. Grandy (1992) conducted a survey of GRE examinees earning bachelor's degrees in mathematics, natural sciences, and engineering to understand better the factors involved in student choice of field for graduate work. This study identified a number of student characteristics, based on the survey questionnaire and the GRE background questionnaire, that contrast students persisting in science and engineering from those switching to other fields. Further analysis of the data also provided information on gender and ethnic differences among the fully committed science and engineering students, namely, those planning to continue in science and engineering (Grandy, 1994b).

One special group of students who have come to the attention of educators is older students. Since the 1970s, increasing numbers of people have been attending college and graduate school after spending time in the workforce or raising a family. As a result, colleges have steadily gained more older students who bring to the campus their own special life experiences and, often, different interests and needs than those of traditional students. In 1976, nearly half of the people who took the GRE General Test were under 23 years of age, and only 15% were over age 30 (Hartle, Baratz, & Clark, 1983). Five years later, the number under 23 had dropped to 39%, and the number over age 30 had risen to 21% (Clark, 1984).

Concern has risen in recent years over the effects of the increasing number of adult students on the talent pools of various disciplines. The GRE Board recently funded a survey of science and engineering graduates who have been out of college at least five years and who are now planning graduate study (Grandy, in progress). Results of that survey are being used to create a model whereby employment experiences and background information contained in the GRE files may be used to predict who will continue in science and engineering and who will abandon these fields for new academic disciplines leading to possible career changes.

Because of the numerous uses of the GRE files for studying talent flow, the GRE Board, in 1986, funded the creation of a special talent flow database to be used for that purpose (Grandy, 1992). The details of that work are described below.

GRE Talent Flow Database

In recent years, researchers and policy makers have come to recognize the annually produced GRE files as valuable sources for studies of talent flow between undergraduate and graduate school. When test takers register to take the GRE, they complete a background questionnaire that asks, among other things, their undergraduate major field and their intended field of graduate study. With this information, along with subsequent test scores, grades, parents' education, age, gender, ethnic group, citizenship, and other variables, we are able to examine patterns that relate major field choices, and changes in those choices, to background data and academic ability.

Before the construction of this database, studies using the GRE files were costly because of the length and complexity of the files and because of the careful and tedious programming that had to be done to accommodate the coding changes that took place as the questionnaire was revised over the years. It became clear that if we were planning to conduct further talent flow studies using the GRE data, we would need a database designed especially for that purpose.

In 1986, the GRE Board funded a project to create a special database that has since provided inexpensive, easy access to GRE data for talent flow studies. Results are reported in Grandy and Robertson (1992).

The first major step in that project was to recode the major fields so that each code designated the same field every year from 1978 to 1987 (excluding 1979[3]). We then selected from the GRE General Test files just those variables judged to be pertinent to talent flow studies. The database itself was built to contain records of all U.S. citizens who registered to take the GRE between academic year 1977-78 and 1986-87. It consists of three different structures: (1) a short individual examinee file in which one record exists for each test taker; (2) a square matrix in which cells contain useful statistics for various combinations of detailed undergraduate and graduate majors; and (3) a square matrix containing statistics for combinations of broad categories of undergraduate and graduate majors.

The database, in the first format, remains on computer files for public use. The other two formats are on hard copy for rapid lookup. Detailed documentation on the content, format, and use of the database is reported by Robertson (1993).

Database Revision

In 1992, a major revision of the database was undertaken. The revision included the following changes:

- addition of six more years of data
- inclusion of ALL variables contained in the GRE files, from 1982 through 1993
- inclusion of ALL examinees in the GRE files
- extensive recoding and standardization of major fields

Additional Years

Unless trend statistics include current data, they are of historical interest only. The primary purpose of this project, therefore, was to update the talent flow database to include six more years' data, from 1988 to 1993. In constructing the revised database, it was necessary to retrieve all files from the original GRE files rather than simply to append the existing database (as described in greater detail below). Unfortunately, data from 1978 through 1981 had to be omitted from the revised database because the original files for those years had not been retained. Therefore, the revised database contains all data from 1982 through 1993.

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[3] The 1979 history files contain errors in major field codes, thus precluding accurate analyses of talent flow.

Additional Variables

Besides the need to make the database more current, our experience thus far had indicated that there were considerably more talent flow questions worth exploring if we included more questions from the GRE file. For example, whether or not examinees had books or articles published and whether they had been elected to national honor societies could provide further indications of academic excellence beyond GRE scores and grades. We found in our survey of science students (Grandy, 1992) that publications combined with other indicators of high verbal skill were associated with leaving the sciences.

Whether examinees are applying for financial aid, and whether they will be dependent on financial aid for graduate school may be two important questions bearing on the relationship of the economy to the decision to enroll in graduate school. We found that among prospective divinity students, for example, half of the women and 36% of the men indicated that their graduate school attendance would be dependent upon receiving financial aid (Grandy and Greiner, 1990). Talent flow studies could investigate the degree to which financial pressures differentially affect men and women in their selection of fields of study. Because we could not anticipate what variables might be useful in future studies, we decided to include all GRE variables in the revised talent flow database.

Not all background questions were asked every year, and some response categories were modified in their wording or increased in number. The following variables, though not necessarily available for all years, are in the revised database:

Test year
Gender
Birth date
Educational level at time of registration
Country of birth
Size of undergraduate institution
Type of undergraduate institution
Undergraduate major field
Intended graduate field of study
Type of graduate institution desired
Year of last graduate school attendance
Highest education of father
Highest education of mother
Family income
High school location
U.S. citizenship status
Country of citizenship
State or province
Ethnicity
Disability
Reasons for taking the GRE General Test
Reasons for taking a GRE Subject Test

Whether planning full-time or part-time study
Educational level
Year of bachelor's degree
Graduate degree objective
Overall undergraduate grade-point average
Number of undergraduate courses in each of 28 fields
Whether communicate best in English
Whether English is the dominant language in the household
Native language
Whether had a book or article published
Whether were elected to an honor society
Whether planned to apply for financial aid
Whether enrollment depends on financial aid
Preparation for the General Test
Preparation for the Subject Test
Preferred geographic region for graduate school
GPA in undergraduate major
GPA for the last two years of college
Hours per week worked for pay
Hours per week of community service
Most important honors received
TOEFL score (self-reported)
Whether applied for national fellowship
Full-time work or military experience
GRE verbal score
GRE quantitative score
GRE analytical score
Recoded undergraduate major field
Recoded graduate field
Recoded broad undergraduate major field area
Recoded broad graduate field area
Indicator of change from undergraduate to graduate broad field

Because the primary reason for creating the database was to study talent flow, that is, the change in field of study between undergraduate and graduate school, we created a "change" variable and added it to each record. Examinees planning to move from one broad field to another were coded "1" for changing. Those intending to continue in the same broad field were coded "0." Someone changing from chemistry to political science, for example, was given a change code of 1. On the other hand, someone changing from chemistry to biochemistry was given a "0" because the change did not require a move from physical sciences--one of the broad fields of study. By incorporating this variable into the database, statistics based on change could be easily computed.

Additional Examinees

The previous form of the database included only U.S. citizens. Because of the growing number of international students taking the GRE, it seemed appropriate to include these examinees as well, in the event that future studies of talent flow among noncitizens, particularly resident aliens, might be requested. Furthermore, we included even those examinees who did not specify intended fields of study, thus permitting future study of examinees who may be uncertain about their graduate school plans.

If an examinee took a test more than once in the same year, only the first record was included in the new database. Therefore, the database includes all of the examinees who are in the original GRE files, but not all of the records in those files.

Recoding of Major Fields

Adding six years of data and producing further statistics might have been a simple process if the GRE background questionnaire had not been completely revised for the 1987-88 academic year. The new list of major fields, in fact, bore little resemblance to the earlier list. Appendix A contains the major field list for 1986-87; appendix B shows the list for 1988-89. It is clear from visual comparison that achieving comparability was not an easy task, and many questioned whether it was possible. Furthermore, there were minor changes from year to year, with only a few fields being eliminated and others added.

Major fields listed after 1987 were not just more specific than those listed earlier. Otherwise, translation would simply have been a matter of collapsing the later field descriptions into the earlier ones. Some were actually broader. Some fields were totally eliminated. Some interdisciplinary fields were added. Recoding was not a simple matter, nor is the result completely satisfactory.

After some unsatisfactory attempts at translating the pre-and-post-1988 codes, we devised an intermediary set of 86 detailed codes (plus an 87th code for missing response). Appendix C shows, year by year, the transformations from the 1978-1987 codes to the new detailed codes. Footnotes indicate those fields that are not completely comparable throughout the 12-year period.

The codes used in the 1988-1993 GRE background questionnaire were also translated into the 87 new detailed codes. Results of that translation are in Appendix D. Thus, the 87 codes became a link between the pre-and-post-1988 codes defined in the GRE files.

Throughout this report, we refer to this set of 87 major fields (86 fields plus "missing") as **detailed** fields of study. For many applications, only **broad** fields of study are necessary. The broad fields discussed in this report are as follows:

arts and humanities (which includes history)
mathematics, physical sciences, and computer sciences[4]
engineering
biological sciences
social sciences (which includes psychology)
health sciences and services
education
business
all other fields

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[4] Throughout this report, the category of mathematics, physical sciences, and computer science is sometimes referred to as "math/science" for simplicity.

Appendix E defines each of these broad fields in terms of the 87 detailed revised major field codes. In the revised database, the old major field codes are retained with the new. Missing data fields indicate that either that question was not asked that year, or the test taker omitted the question.

Availability of the Revised Database

The revised database, because it is quite large, is available for analysis on the ETS mainframe computer. Appendix F contains the data set layout.

Other formats of the database are available in hard copy or on floppy disk, all consisting of extensive summary statistics. These tables can be obtained on request, either as hard copy or as downloaded ASCII files on floppy disk. At present, they have been computed only for U.S. citizens, but tables for international examinees can be computed quite easily.

Currently there are several formats of these tabular files consisting of trends and of square matrices, for broad and detailed majors. Because they consist of about 1,500 pages, they have not been published. Samples of these tables are included in Appendix G. Additional tables that are of interest to the reader are available upon request from the author, as hard copy or on floppy disk.

Research Questions

Based on the revised database, we investigated a number of research questions pertaining to talent flow among GRE examinees:

- Which broad fields of study have shown the greatest increases and declines in selection as graduate majors? Which specific fields, within the broad fields, have contributed most significantly to those trends?

- Has there been a change in the academic quality of candidates planning graduate study in some areas? Do some areas attract lower or higher scoring candidates than those areas did in the past?

- What changes have occurred in the gender, ethnic, and age distributions of candidates planning graduate study in each broad area and in selected specific fields? Which fields have been attracting the most rapidly increasing numbers of female, minority, or older candidates?

- Has the growth or decline in candidates with doctoral intent paralleled the growth or decline intending to earn less than a doctorate? Are there some fields in which greater proportions of candidates are seeking doctorates instead of master's degrees?

- Which fields have the greatest and the least holding power? Have any fields gained or lost holding power over the past 12 years?

- Which undergraduate majors fields most frequently serve as feeders to specific graduate fields?

- Which graduate fields attract the greatest number of people from different undergraduate fields? Among those graduate fields attracting large numbers of people from other areas, which areas are the primary feeders, and have the numbers changed much over the past 12 years?

- Is the decision to change fields between undergraduate and graduate school associated with age, time since earning a bachelor's degree, gender, ethnic group, test scores, or undergraduate grades?

- Among examinees with a bachelor's degree in a specified field, what variables are associated with their choice of graduate field?

- Are the answers to these questions different for examinees planning to earn a doctorate than for examinees with less than doctoral intent? Do some patterns hold for one gender and not the other or for one ethnic group and not another?

The remainder of this report will explore answers to these questions. The first few analyses will look at general trends among GRE test takers to provide a context for the remaining analyses, which will examine specific talent flow questions. Numbers may differ somewhat from those published elsewhere. Discrepancies should be minor and are due to differences in the selection procedures used to sample examinee data from the GRE files.

Analysis of the GRE Talent Flow Database for U.S. Citizens

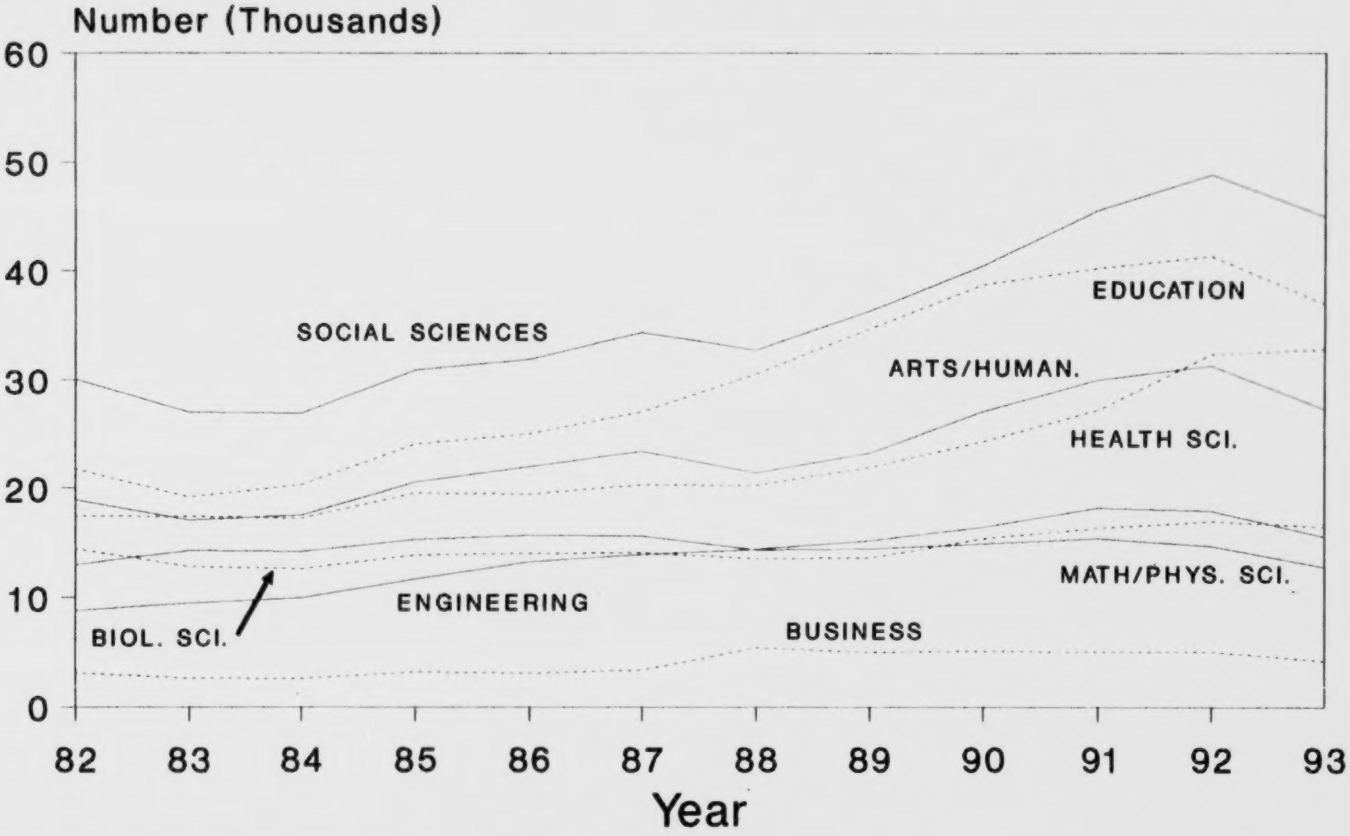
There has been an overall increase in the number of U.S. citizens taking the GRE General Test over the 12-year period studied. Between the first two years--1982 and 1983--there was a slight decline, and between the last two years--1992 and 1993--there was a similar decline. But for the 10-year period from 1983 to 1992, numbers rose steadily, from 156,336 to 291,080. This increase amounted to an 86% gain in GRE candidate volume among U.S. citizens taking the General Test.

Trends by Intended Area of Graduate Study

Areas of Study. Essentially all broad areas of graduate study showed gains during this period, though some showed markedly greater gains than others. Figure 1 shows trends in the selection of eight broad areas of graduate study. The social sciences held the highest volume throughout the period studied, fluctuating between a high of 18.0% the test-taking population in 1982 to 14.8% in 1988. Business consistently attracted the fewest examinees, the highest number (in 1988) composing only 2.4% of the test-taking population. This is not surprising because business students typically take the Graduate Management Admission Test (GMAT) for admission to business school. The population of business students taking the GRE, therefore, is not only small but probably atypical.

Figure 1

Trends in the Selection of Eight Broad Areas of Graduate Study



ALL U.S. CITIZENS TAKING THE GRE

The following table shows, in the first column, the percentage increases (rank ordered from high to low) in each area of intended graduate study between 1983 and 1992--the 10-year period during which overall growth increased steadily. The second and third columns show the percentages of the GRE population, in 1983 and 1992, choosing each area of graduate study.

Area of Intended Graduate Study[5]	Percent Increase in Numbers	Percent of GRE Population 1983	1992
Education	115.5%	12.3%	14.2%
Business	93.8%	1.6%	1.7%
Engineering	89.8%	6.0%	6.2%
All other fields	89.6%	11.0%	11.2%
Health sciences and services	86.3%	11.1%	11.1%
Arts and humanities	83.2%	10.9%	10.8%
Social sciences	80.9%	17.3%	16.8%
Biological sciences	32.5%	8.2%	5.8%
Mathematics, physical and computer sciences	3.0%	9.1%	5.1%

Most striking, perhaps, is the negligible growth in the category of mathematics, physical sciences, and computer sciences. In fact, because the total number of test takers increased 86% during this period, the proportion of examinee volume made up of people in mathematics, physical sciences, and computer sciences declined from 9.1% in 1983 to 5.1% in 1992. The proportion in biological sciences showed a similar decline, from 8.2% in 1983 to 5.8% in 1992. Outstanding too is the number planning graduate work in education, a number that more than doubled. The apparently large increase in business students is somewhat misleading because the actual proportion of the GRE population choosing business is quite small. Consequently, a small increase in absolute numbers can appear as a large percentage increase. Most fields, other than education and natural sciences, showed increases approximately equal to the average gain for the GRE population.

Which fields within the sciences and within education might have contributed the greatest weight to their trends? In the case of mathematics, physical sciences, and computer sciences, there were declines in the actual numbers planning to study computer science and geology. These declines were offset by increases in the numbers planning to study mathematics and physics. The number choosing chemistry remained about the same. Thus, the average over all fields in this area showed practically no change. In the area of education, large increases occurred in all fields except physical education. The fields included all teaching areas and educational administration.

Academic Qualities. It is sometimes said that as the number of applicants to a field increases, overall student quality declines. Studies relating number of test takers with mean test scores show that this relationship does not hold true in general (Adelman, 1985; Grandy & Robertson, 1992).

The GRE database contains a number of questions directly or indirectly related to academic quality. Three of these are test scores; another is grade-point average (GPA) in undergraduate major. In our analyses of test scores, we have discussed verbal and quantitative scores only, although all statistics have been computed on analytical scores. The reason for not including analytical score statistics was that in every case considered, analytical scores lay somewhere between verbal and quantitative scores, and contributed nothing to the analyses.

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[5] The number of examinees who did not specify an intended field of graduate study also increased 158% (from 19,348 to 49,977) between 1983 and 1992.

Trends in GRE verbal score averages showed a small increase from 500 to 509 between 1982 and 1989, followed by a sharp decline to 496 in 1993. Trends for each broad major field showed a similar rise-and-fall pattern, with some variations. See Figure 2. The number of examinees planning graduate work in education and in arts and humanities increased the most. Mean scores among those in education rose from their lowest point in 1982 to their highest in 1988--an increase of 19 points. Since that time they dropped 12 points, but still maintain an overall upward trend over the 12-year period. Education also showed the greatest increase in numbers of examinees. We might conclude that, at least through 1988, education was attracting greater numbers of students with high verbal ability. Whether the decline in verbal scores after 1988 is indicative of another trend away from education remains to be seen.

Examinees planning graduate work in arts and humanities not only have maintained the highest verbal score averages, but have also shown large increases in those averages. Their average rose 32 points between 1982 and 1990, when it peaked at 569.

Health sciences and services is the only area that showed a decline in verbal scores, from a mean of 491 in 1982 to a mean of 466 in 1993. Examination of the specific fields that make up health sciences and services cannot easily explain this score decline. Essentially all fields in this area--nursing, physical therapy, veterinary medicine, speech pathology, public health--showed some decline. Later in this report we will examine changes in these constituent fields more closely.

Quantitative score averages showed increasing trends for examinees planning graduate study in engineering, math/physical sciences/computer sciences, and education. Those in other fields remained about the same, or showed random fluctuations, over the 12-year period. See Figure 3.

Analytical scores increased markedly, but because the test was changed during this period, it is questionable whether trends should be interpreted. For any particular year, comparisons of analytical score means may prove useful.

Although average test scores have increased for examinees planning graduate work in nearly all areas of study, those averages maintained approximately the same rank ordering. Examinees with the highest verbal scores were most likely to be in arts and humanities, second highest were in mathematics, physical sciences, and computer sciences. Those with the lowest verbal scores were most likely to be in education; second lowest were business and health sciences and services. In the middle, and of about equal rank ordering were those in engineering, social sciences, and biological sciences. Of course, there are large variances in test scores within each of these groups.

Average quantitative scores differed more from group to group than did verbal score averages. The range of mean verbal scores was contained within about 100 points. Mean quantitative scores ranged over 200 points, from about 450 for examinees in education to about 670 for examinees in engineering. There was considerable variation within groups, partly because the groups were defined so broadly. For example, in 1993, examinees in physics scored 704 on average (much higher than the average for engineers), and examinees in geology earned average scores of only 602, yet physics and geology are in the same broad major field category. These variations should be kept in mind when

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Figure 2

Trends in GRE Verbal Test Scores by Intended Area of Graduate Study

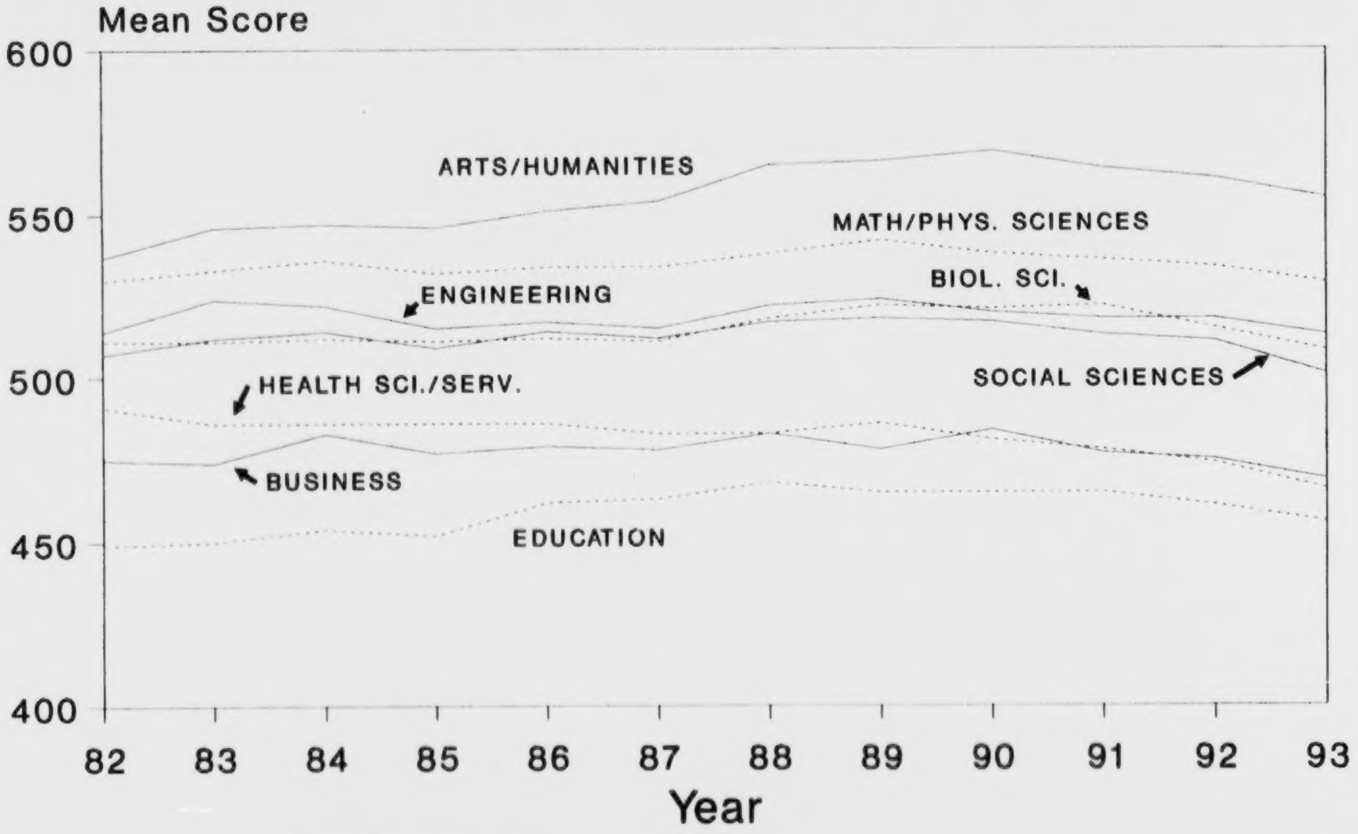

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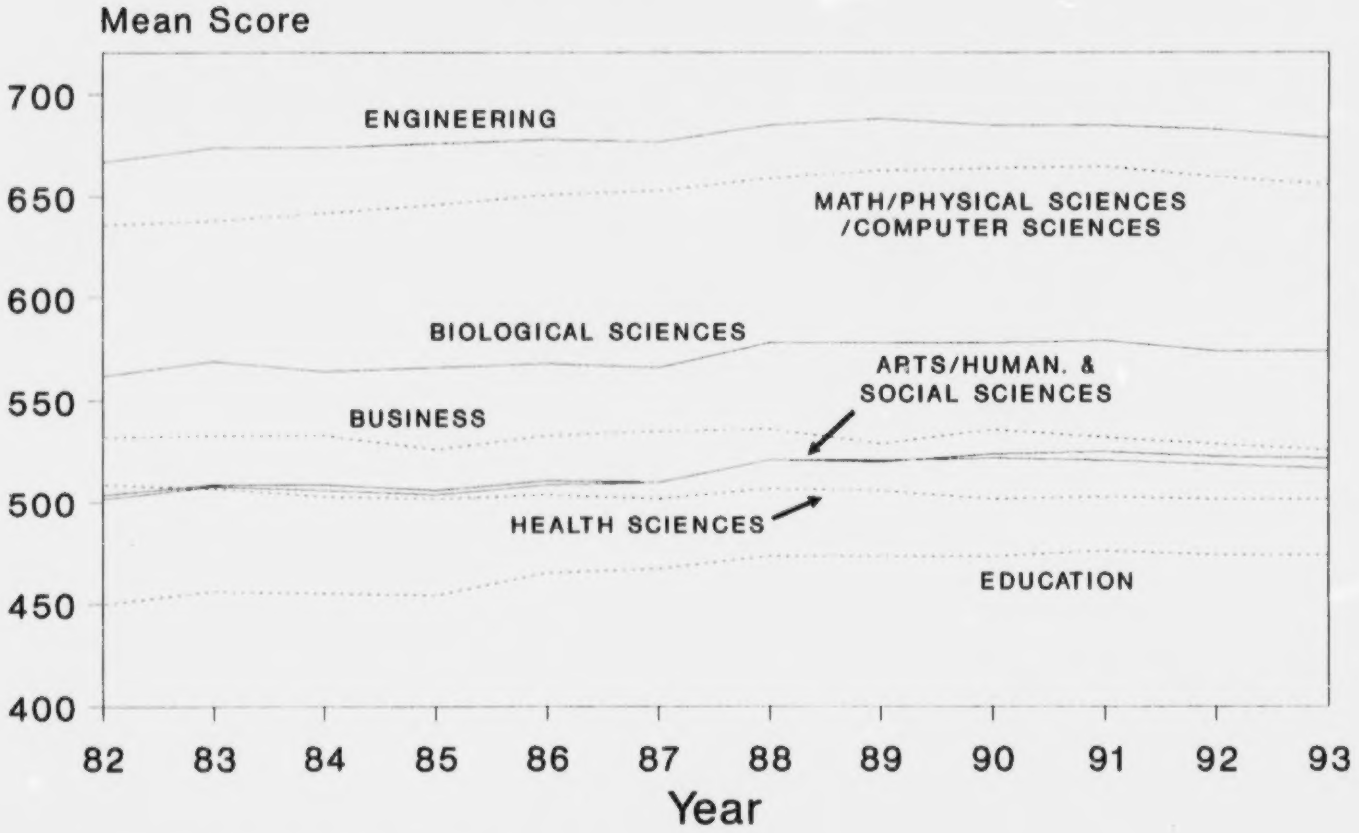
Figure 3

Trends in GRE Quantitative Test Scores by Intended Area of Graduate Study



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comparing test scores and other characteristics of examinees across these various areas of graduate study. Nevertheless, as we will see later in this report, examinee choice of a graduate area of study appears to depend, at least in some part, on relative verbal and quantitative abilities.

GPA in major, for examinees in all areas of study, increased over the 12-year period. It is difficult to know whether *trends* in GPA are meaningful because an increasing trend may indicate grade inflation. Comparisons across major field groups may indicate more lenient grading practices in some disciplines than in others. Within a discipline, however, we may expect to find a greater tendency for examinees with lower than average grades in their major to switch fields for graduate school. Later in this report we will explore this possibility.

Gender. Between 1982 and 1993, the percentage of females planning graduate study in almost every area increased a very small amount (Figure 4). Overall, the number of female test takers rose from 56% to 60% of the examinee population. Though this is an increase of only 4 percentage points, growth was continuous from year to year.

Not every area of study showed the same degree of growth. In education, for example, there was essentially no change in gender composition. Three of the four fields in which the female share increased the most were fields already dominated by females, namely, health sciences and services (from 74% to 79%), social sciences (from 58% to 63%), and arts and humanities (from 51% to 55%). The proportion of female examinees planning to study business (a field in which males outnumber females 3 to 2) showed the greatest increase, from 41% to 47%.

In the scientific fields traditionally dominated by males, growth in the percentages of females was very small or negligible. In mathematics, physical sciences, and computer sciences, the proportion of female examinees increased by only 1 percentage point (from 30% to 31%). In engineering, there was a 2% increase (from 17% to 19%). In the biological sciences, in which females may no longer be regarded as underrepresented, there was only 1 percentage point increase (from 51% to 52%).

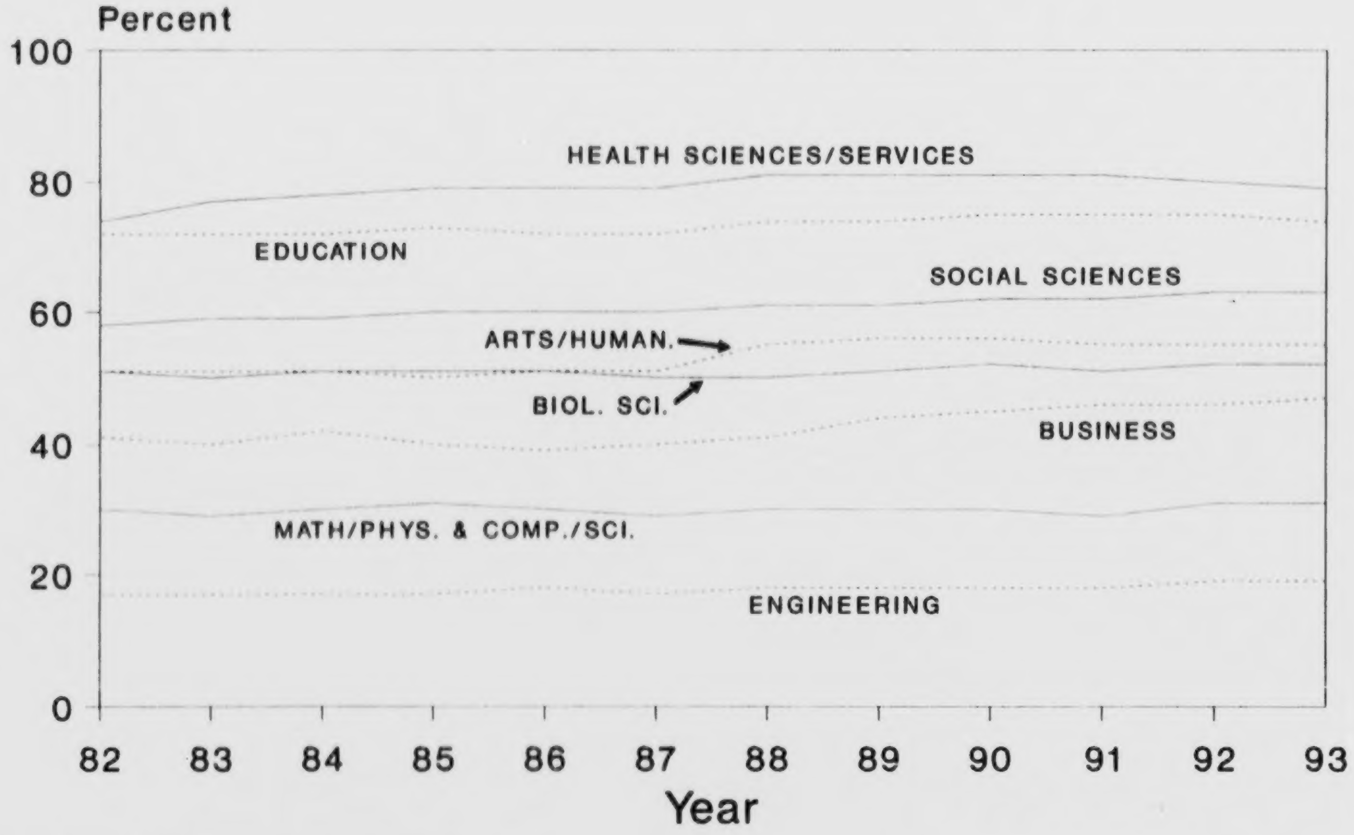
These figures are not entirely consistent with the interpretation of graduate enrollment statistics that suggest a considerable increase in the participation of women in science and engineering (National Science Board, 1991). We have taken one example for comparison to see the extent to which GRE data may parallel actual enrollment data and to explore a possible discrepancy between the two. We have chosen the most underrepresented field, engineering, for the comparison. The following table displays statistics from the GRE file for 1982 and 1989.[6] Published first-year full-time enrollment statistics apply to the following years, 1983 and 1990[7]. The time periods, t1 and t2, refer to these years.

---

[6] Note that the statistics in this table are slightly different from the statistics reported in the previous paragraphs because they are selected from different years.

[7] First-year full-time enrollment statistics are published by the National Science Board (1991, appendix table 2-12, p. 242). Percentages reported in the table were computed by the author.

Figure 4
Female Share of Test Takers
Planning Each Area of Graduate Study



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Comparison of Numbers of GRE Test Takers Planning to Study Engineering with Subsequent First-Year Full-Time Enrollment in Engineering

	GRE Statistics	*Enrollment Statistics*
No. males at t1	7,233	16,899
No. males at t2	12,452	17,213
Percent increase	72.2	1.9
No. females at t1	1,465	2,366
No. females at t2	2,712	3,040
Percent increase	85.1	28.5
Percent female at t1	16.7	12.3
Percent female at t2	17.9	15.0
Increase in female share (percentage points)	1.2	2.7

For both males and females, we see a far greater increase in the number taking the GRE than in the number enrolling in graduate school. It is especially puzzling to see such a great discrepancy between the increase in male GRE test takers and the increase in male enrollment. But that is not the point to be made from these statistics. The growth in female enrollment is impressive: 28.5% in just 7 years. But this outstanding growth does not address the issue of underrepresentation. Even with male enrollments increasing a mere 1.9% and female enrollments increasing 28.5%, the percentage of females enrolled as first-year engineering students increased only 2.7 percentage point: from 12.3% to 15.0% of all enrolled first-year engineering students.

Examining the GRE statistics, we see that the percentage increase in female test takers was higher than it was for male test takers, but the difference was not so extreme as it was for enrollment increases. Nevertheless, an increase of 85.1% in just 7 years appears to be quite impressive. The increase in the female share, however, was only 1.1 percentage points. In other words, in 1982, only 16.8% of test takers in engineering were female, and by 1989 that figure had grown by only 1.1%, to 17.9%.

When viewed in these terms, whether we examine the GRE statistics or the enrollment statistics, women have made very little progress toward equal representation in engineering. A similar argument applies for the sciences as well. These statistics have been presented here to emphasize that trend statistics may be interpreted very differently depending on the way percentage changes are reported. Apparent discrepancies between GRE statistics and statistics based on other databases may not be as large as they first appear. Furthermore, in studies of underrepresentation, whether of females or ethnic minorities, the way in which these statistics are presented influences conclusions. It is most important to be aware of which way the percentages are reported when interpreting trend data and talent-flow information.

Ethnic Group. Statistics for minority examinees are similar in many ways to those for female examinees. The number of minority test takers has grown dramatically in most areas of study, but so has the number of White test takers. The proportion of minorities has increased very little in some areas, and noticeably more in others.

Between 1982 and 1993, the percentage of non-white test takers rose from 13.7% to 16.9%. Figure 5 shows trends in the proportion of minorities in each of the eight areas of intended graduate study. Essentially all fields showed increases after about 1987 or 1988; before that time--between 1982 and 1987--there was essentially no change in the minority share in any area. The area with the largest percentage of minorities was business, and it increased by 4 to 5 percentage points over the period studied. Engineering, second highest, increased by 7 percentage points, a gain greater than in any other field. Arts and humanities--the area attracting the fewest number of minorities--grew by 3 percentage points in just the last few years. Mathematics, physical sciences, and computer sciences showed an increase almost as large as that in engineering. Health sciences and services showed only the slightest increase.

These statistics treated all minority examinee data together. There were, of course, considerable differences among the various ethnic groups. Some of these differences have been reported in a pair of documents prepared for that purpose (Grandy, 1994c). It is beyond the scope of this report to discuss trends in all fields of study for all ethnic groups. Tables presenting that information are available from the author.

Age. Between 1982 and 1988, the proportion of test takers over age 30 grew from 20% to 28% of the population of U.S. citizens taking the General Test. After that time, with the number of test takers of all ages steadily growing, the percentage of older examinees leveled off and actually decreased to 24% by 1993.

Some areas of graduate study more than others have attracted older students. Figure 6 shows trends in the proportion of test takers over age 30. The area attracting the greatest proportion of older students has been education; engineering and the natural sciences have attracted the smallest. All eight of the broad areas of graduate study showed an increase in older students followed by leveling and, in most cases, some decline. Social sciences showed the greatest decline; engineering showed no decline as of 1993.

Degree Objectives. Overall, the percentage of examinees planning to earn a doctorate has remained steady at about 37%, but there have been considerable differences in that trend by intended field of study (Figure 7). Examinees planning graduate work in arts and humanities have raised their educational aspirations considerably. In 1982, only 45% planned to earn a doctorate; by 1993, that figure had risen to 60%. Test takers in mathematics, physical sciences, and computer sciences--as a whole--showed an increase, but not quite so large. The percentage planning to earn a doctorate rose from 44% to 55% during that period. There were smaller increases in the social sciences, engineering, and in business.

In contrast, examinees in health sciences and services are striving less for a doctorate than they did a decade ago. In 1993, only 20% of the test takers in this area planned to earn a doctorate, compared with 33% in 1982. A small decline--from 27% to 23%--occurred in education.

Figure 5
Minority Share of Test Takers Planning Each Area of Graduate Study

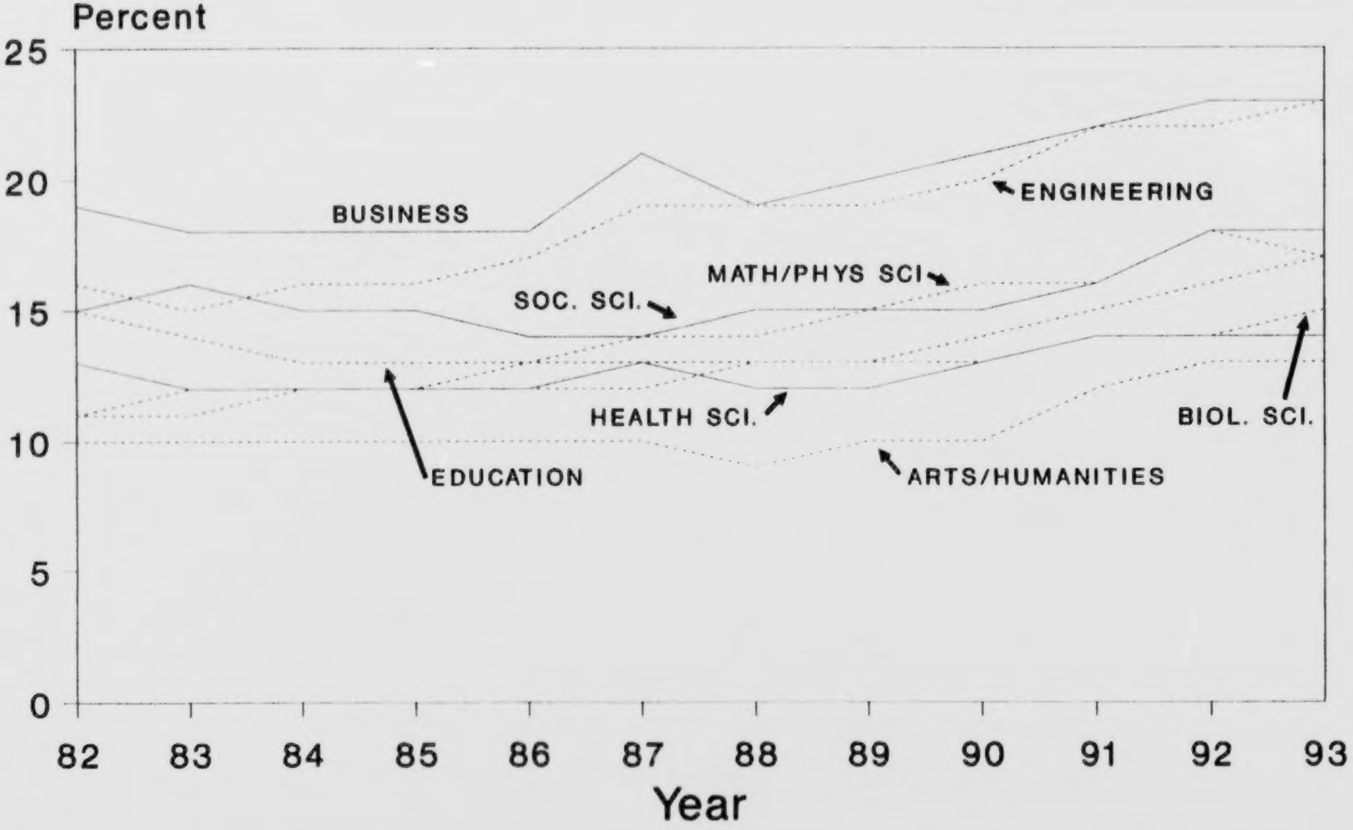

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Figure 6
Share of Test Takers over Age Thirty

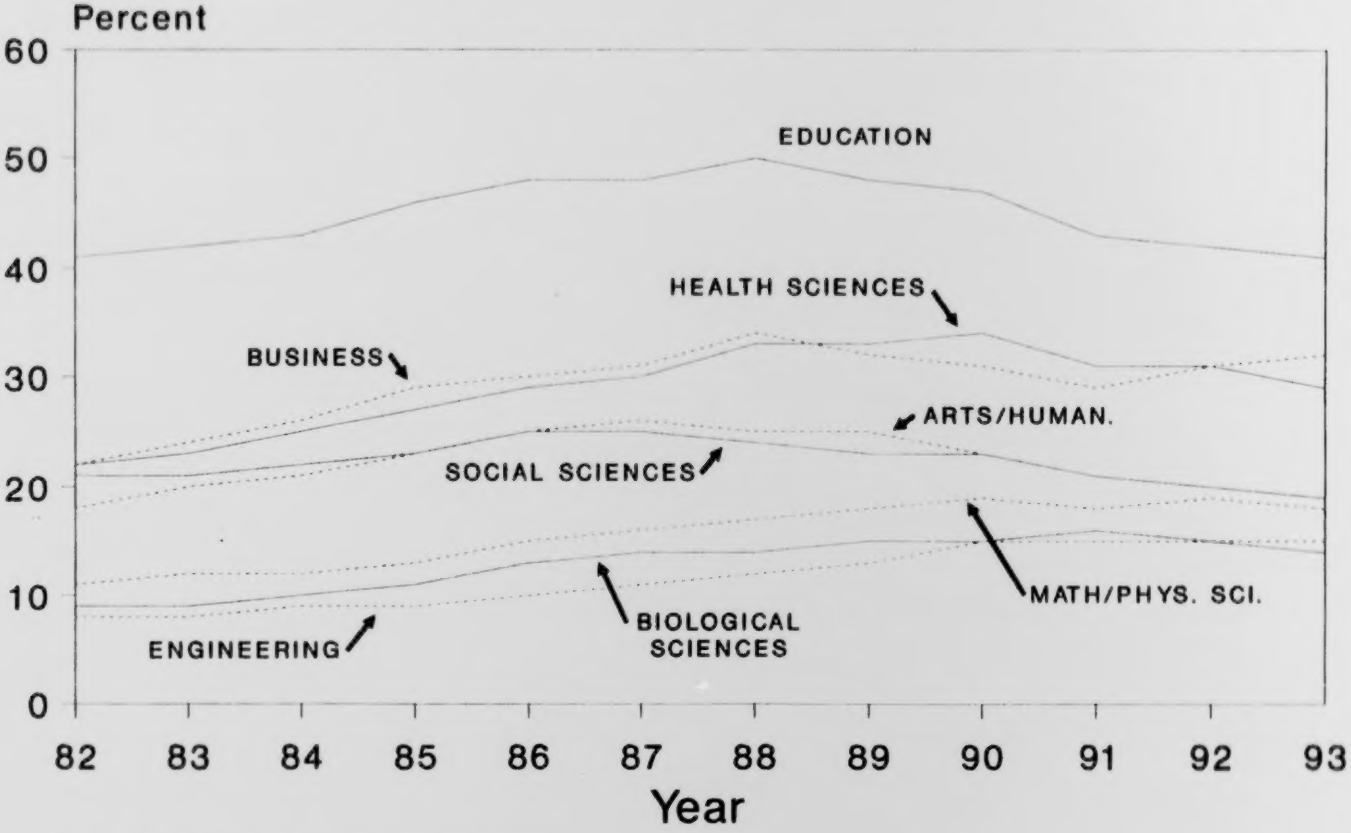

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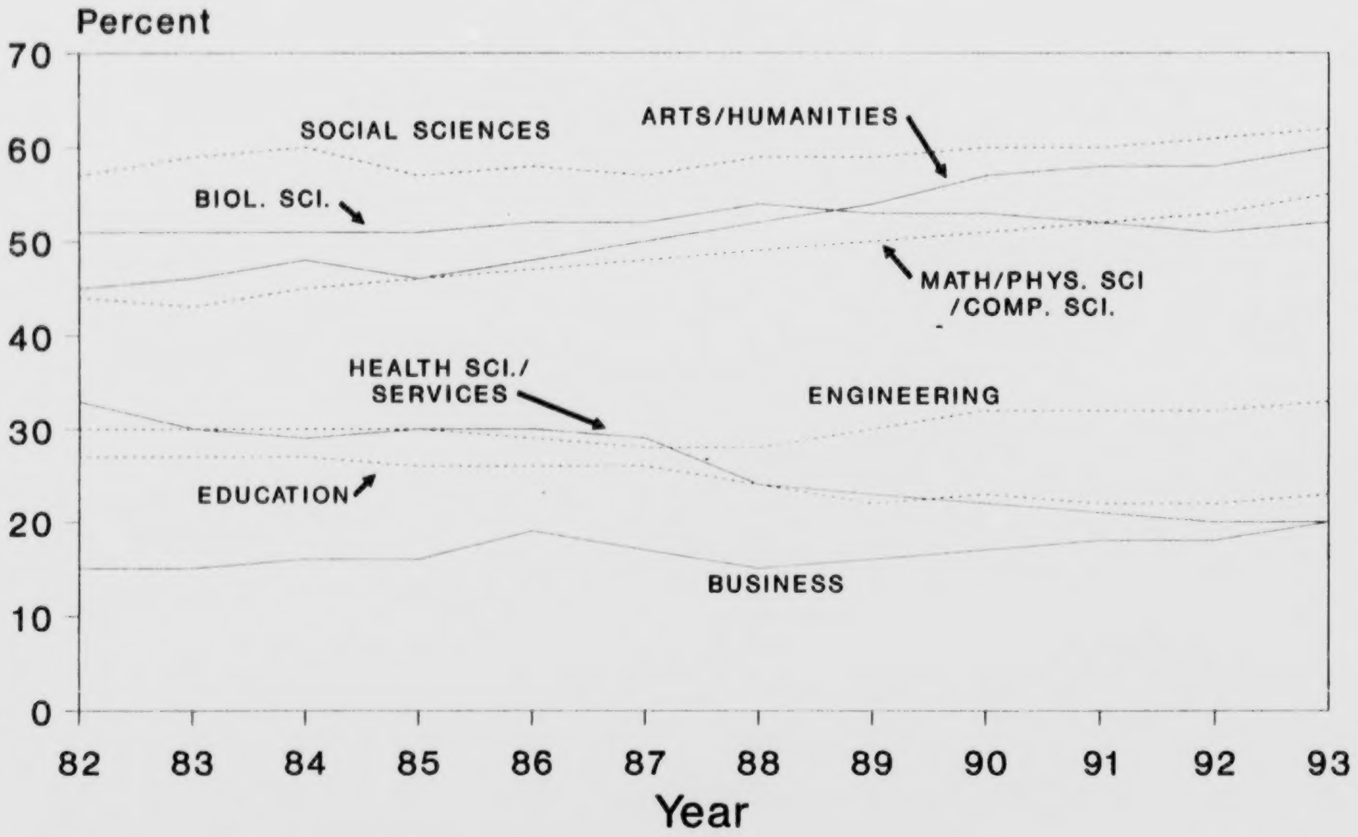
Figure 7

Share of Test Takers Planning to Earn a Doctorate



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One might speculate that these patterns are occurring in response to economic conditions. The number of examinees planning to earn a doctorate has been rising in fields such as arts and humanities in which a doctorate is a definite advantage, if not a requirement, for an academic position, possibly the only employment available to arts and humanities graduates. Numbers planning to earn a doctorate have been declining in health sciences and services, and in education--fields for which a master's degree is advantageous or even necessary for employment as a practitioner or teacher. A doctorate, which might prepare a person for an academic position, may be less useful in those fields at a time when academic positions are at a premium.

Undergraduate Composition. Figure 8 shows, for each area of intended graduate study, trends in the percentages of test takers who earned, or planned to earn, their bachelor's degrees in the same areas. Not surprisingly, engineering was consistently the highest. Perhaps the most difficult field to switch *into* from another field, engineering drew from 85% to 87% of its students from engineering. The remainder came primarily from mathematics, physical sciences, and computer sciences.

One area drawing more than half of its applicants from a different area was business. Business drew one fifth of its applicants from the social sciences. The remainder were from engineering (8%), arts and humanities (7%), and other areas. In 1993, only 47% of the examinees planning graduate work in education earned (or planned to earn) their undergraduate degrees in education.

In most graduate fields there was very little change in undergraduate composition. Exceptions were social sciences and education. Only in those two areas did the percentages change appreciably during the 12-year period. Figures 9a and 9b show cumulative bar graphs comparing undergraduate composition of education and social sciences, respectively.

In education, there was a decrease in the percentage who had done their undergraduate studies in education--from 61% in 1982 to 47% in 1993. Replacing education majors over time were greater numbers of social science majors as well as business majors. In other words, increasing numbers of business and social science majors may now be attracted to education at the graduate level.

The trend in social sciences was not so pronounced, and it was the reverse of that in education. *Increasing* numbers of examinees planning to study social sciences did their undergraduate studies in social sciences. Figure 9b shows the change in composition. In 1982, 6% of test takers planning graduate work in social sciences did their undergraduate work in education; that figure dropped to 2% by 1993. Numbers with degrees in arts and humanities who switched to social sciences also decreased somewhat, from 10% to 7% of the examinees planning to study social sciences. Although these are not large numbers, they show a steady trend over the 12-year period.

How do switches in field of study affect the academic quality of the students applying to a graduate program?

Education and social sciences were the only two fields showing a noticeable change in undergraduate field composition. The last page of Appendix G-2 shows the mean GRE scores of examinees with all possible combinations of undergraduate major and intended graduate major field. Examinees, for example, who had undergraduate majors in social sciences and intended to study education at the graduate level had a mean GRE verbal score of 474 (column 5, row 7, of the first table on that page). They had, on average, verbal test scores about 20 points lower than the average

Figure 8: For Each Graduate Field, the Percent Whose Undergraduate Major Was the Same as Intended Graduate Field

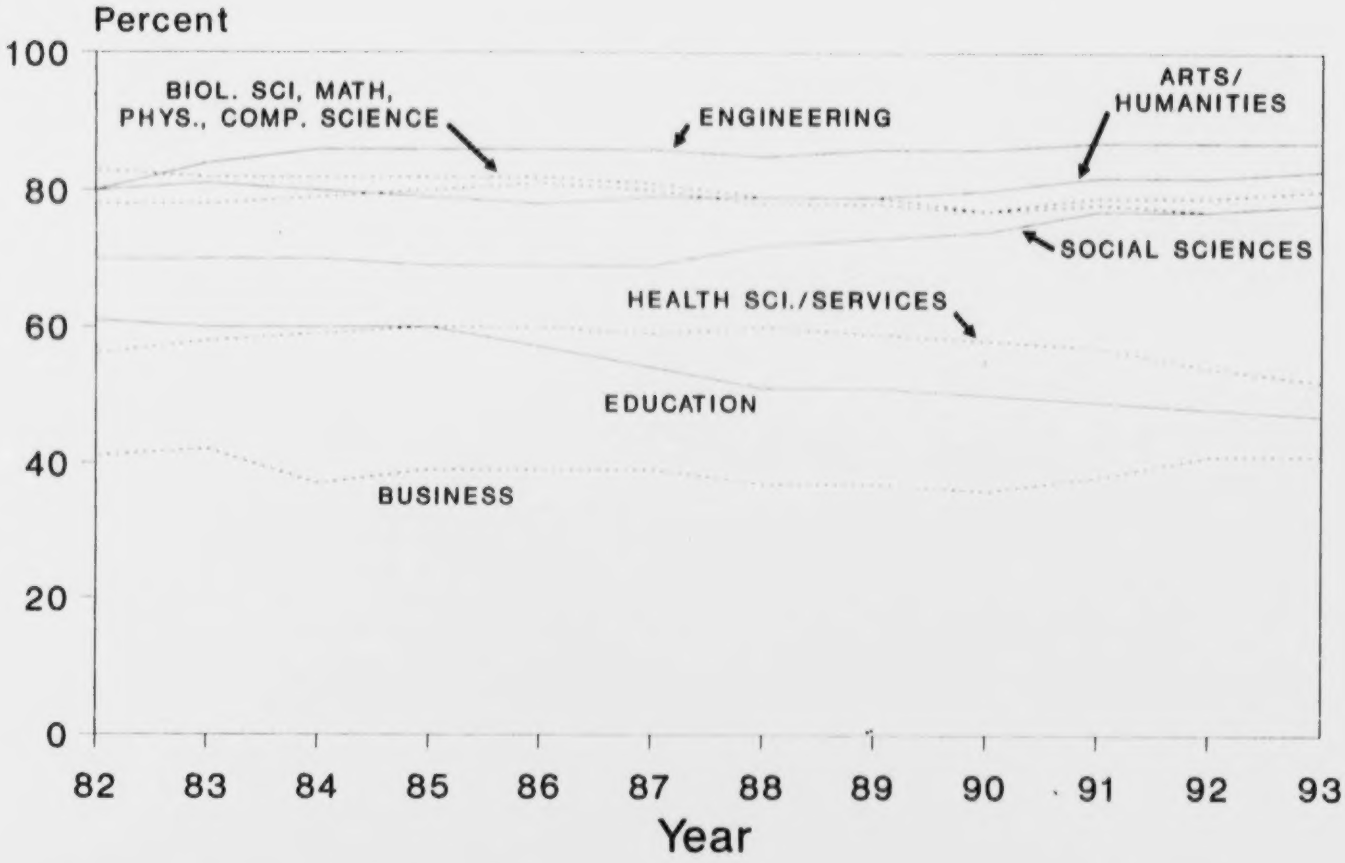

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Figure 9a: Undergraduate Majors of Examinees Planning Graduate Work in Education

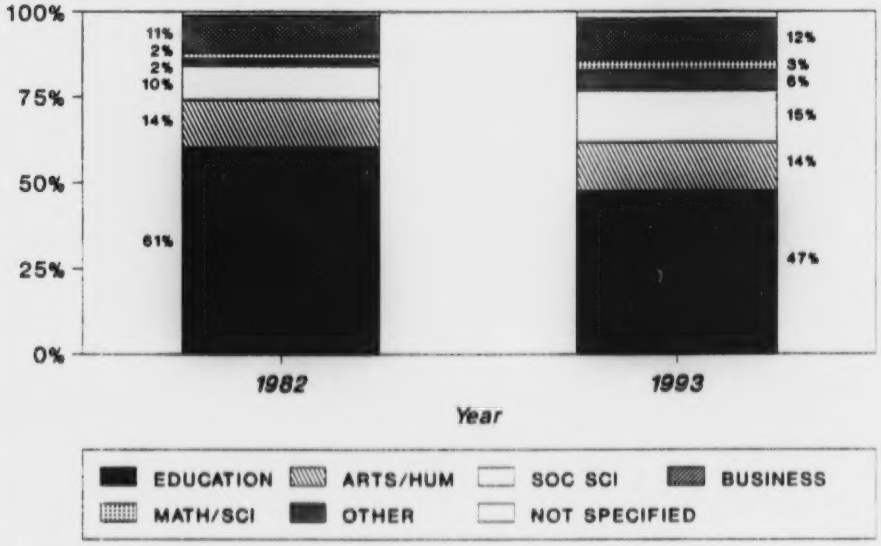

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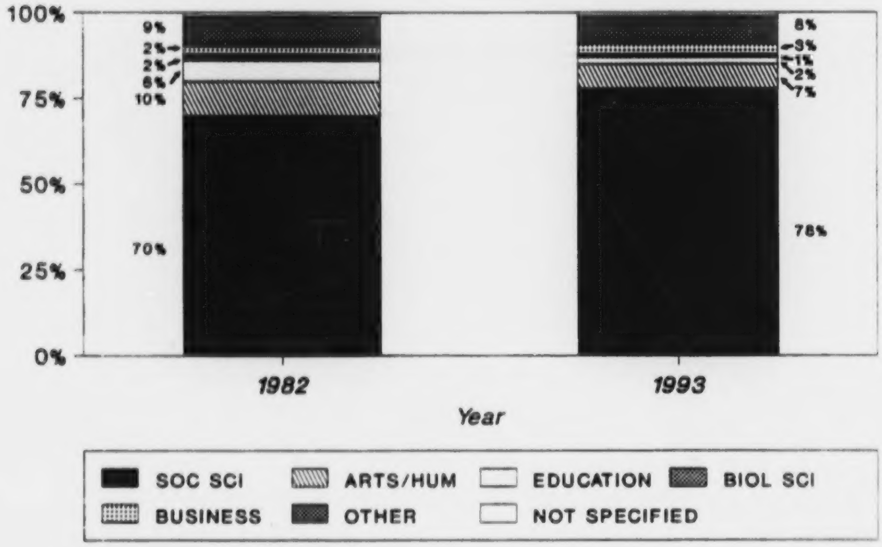
Figure 9b: Undergraduate Majors of Examinees Planning Graduate Work in Social Sciences and Psychology



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for all social science majors (total for column 5). On the other hand, their averages were considerably higher (46 points in 1993) than those of the education majors planning to continue in education (column 7, row 7). Their average quantitative scores were also lower (by 27 points) than the average for other social science majors, yet 35 points higher than the average for education majors continuing in education. A similar pattern holds for business majors switching to education. Their test scores were somewhat lower than those of other business majors but higher than those of education majors continuing in education. To some small degree, therefore, the average test scores of all three groups--those in social science, business, and education--increased as a result of this switch.

Looking at the same figures for examinees planning graduate work in social sciences, we see a similar pattern, but not quite so striking. Education majors switching to social sciences were among the higher scoring education majors, but their scores were not quite so high as those of social science majors continuing in social sciences. A decline in the number of education majors entering social sciences should raise the score averages in social sciences. Arts and humanities majors have the opposite effect. Examinees with undergraduate majors in arts and humanities have higher scores--both verbal and quantitative--than do social science majors continuing in social sciences. A decline in their numbers, therefore, has a adverse effect on the test score averages for social sciences.

A conclusion we may draw from these observations is that there appears to be a fairly consistent relationship between test score averages and major-field switching patterns. If examinees with an undergraduate major in field A have ***lower*** test score averages than examinees in field B, the examinees switching from A to B are likely to have average scores ***higher*** than the mean for field A but ***lower*** than the mean for field B. Similarly, if examinees with an undergraduate major in field A have ***higher*** test score averages than examinees in field B, the examinees switching from A to B are likely to have average scores ***lower*** than the mean for field A but ***higher*** than the mean for field B.

Changes in Field of Study

The previous analyses focused on intended graduate field of study, looking at the characteristics of examinees feeding into designated fields. The remainder of this report will shift perspective. We will focus on each undergraduate field and examine the number and the characteristics of examinees planning to go various directions for graduate school.

Comparing 1982 with 1993 data, Figure 10 shows the holding power of each field, that is, the percentage of examinees planning to do graduate work in the same area as their undergraduate work, for each of the eight academic areas.

Health sciences and services had the greatest holding power of all eight areas, and it was the only one that increased over the 12-year period. Between 1982 and 1993, it increased from 76% to 84%. A close second to health sciences and services was engineering, where holding power decreased just slightly, from 74% to 72% over the 12-year period. Education, which also had a relatively high holding power, also lost only a small amount, from 68% to 65%. The number of examinees in mathematics, physical sciences, and computer sciences who planned to continue in those fields dropped from 68% to 57%, the largest decline except for business. The remaining fields had holding powers of 60% or less, and they all showed some decline over the 12-year period.

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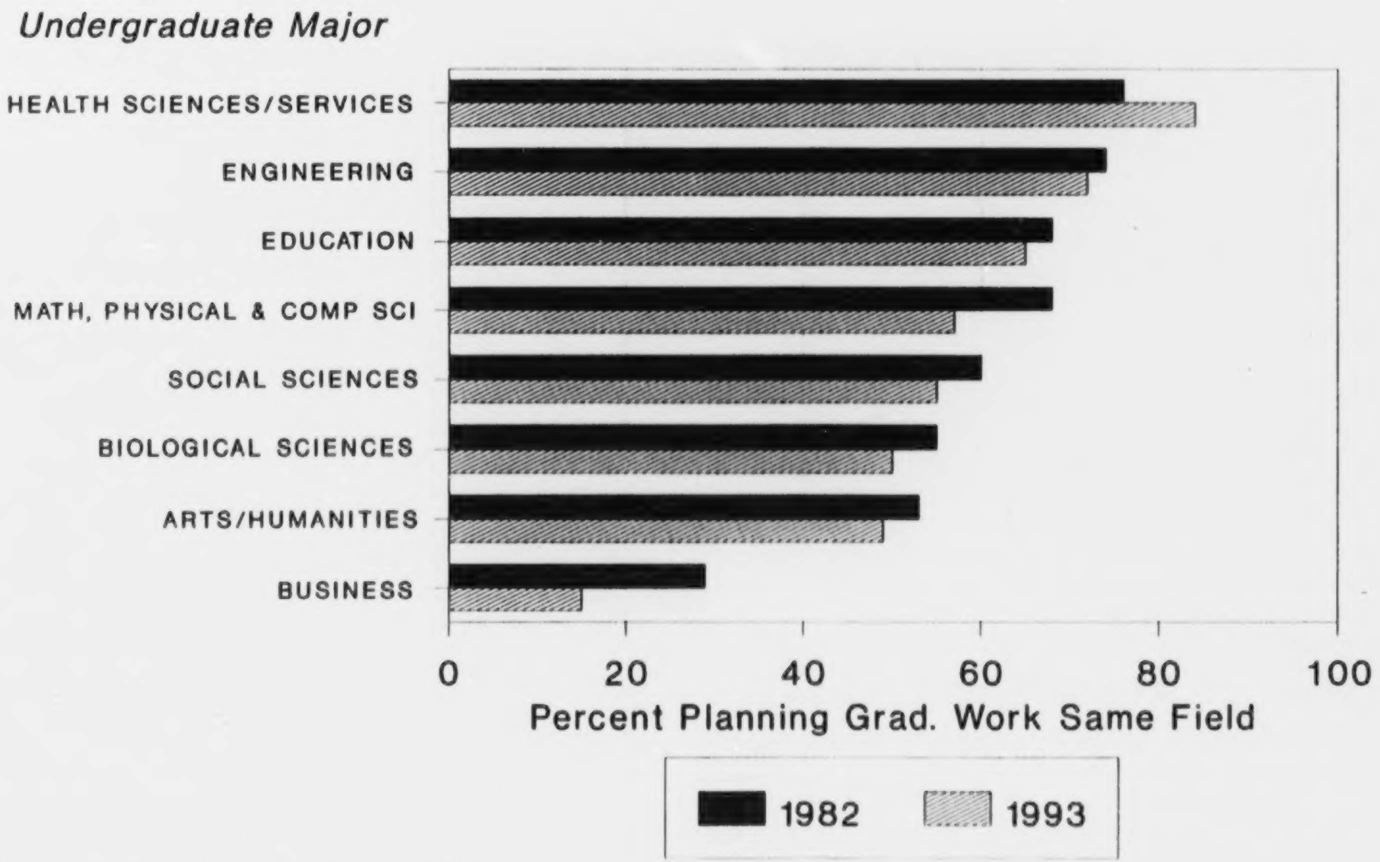
Figure 10: Holding Power of Eight Groups of Academic Disciplines 1982 versus 1993



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An interesting pattern emerges if we compare holding power with the percentage of examinees planning to earn a doctorate. Health sciences and services had the greatest holding power and the fewest people planning to earn a doctorate. Recall that this is a field that includes students in nursing, physical therapy, and speech, hearing and language pathology, most of whom are seeking a master's degree. It also consists of applicants to veterinary and medical schools, but these people are relatively few. Promises of employment opportunities in these areas may well account for their large holding power. Engineering, second highest in holding power, was another field in which over half of all applicants planned to earn only a master's degree. Education, third highest in holding power, is another field in which fewer than one third of examinees planned to earn a doctorate.

In contrast to these fields, arts and humanities, social sciences, and biological sciences had lower holding powers, but within each of these areas, more than 50% planned to earn a doctorate. Could there be a relationship between the percentage in each field planning to earn a doctorate and the holding power of that field?

Many recent articles (such as Magner, 1994) discuss the dismal job market for new Ph.D.s. Job prospects for practitioners, such as teachers and health care workers, may not appear so bleak, and because the jobs require only a master's degree, have gained appeal. The GRE data seem to suggest that fields of this sort--that focus on providing education and credentials for practitioners--appear to have the greatest holding power in the current job market. Figure 11 plots the holding power of each of the eight fields against the percent planning to earn a doctorate. The field of business appears to be an outlier in an otherwise negative relationship between holding power and degree objective. Why might this be the case?

In 1993, only 15% of test takers with undergraduate majors in business planned to study business at the graduate level. Nineteen percent planned to switch to education, 13% to social sciences, and 9% to health sciences and services; the remainder were spread over other fields. The fact that so many business majors planned to switch fields may account for why they took the GRE in the first place. Most likely, the business graduates planning to continue in business (to earn an MBA) took the GMAT instead of the GRE. So, the low holding power of business is likely to be an artifact of test selection.

If we exclude business from our analysis, we do see a strong negative correlation between the holding power of an area and the percentage planning to earn a doctorate[8]. Perhaps the strength and direction of this relationship could be a useful economic indicator.

The holding power of every field was different for males than for females, as shown in Figure 12. In general, more females than males change fields, but in health sciences and services and in education, the reverse is true. Differences in patterns of change, by field of study, will be discussed in more detail later in this report.

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[8] The product-moment correlation among the seven points, excluding business, is -0.87.

Figure 11
Relationship of Holding Power of an Academic Area to Degree Objective

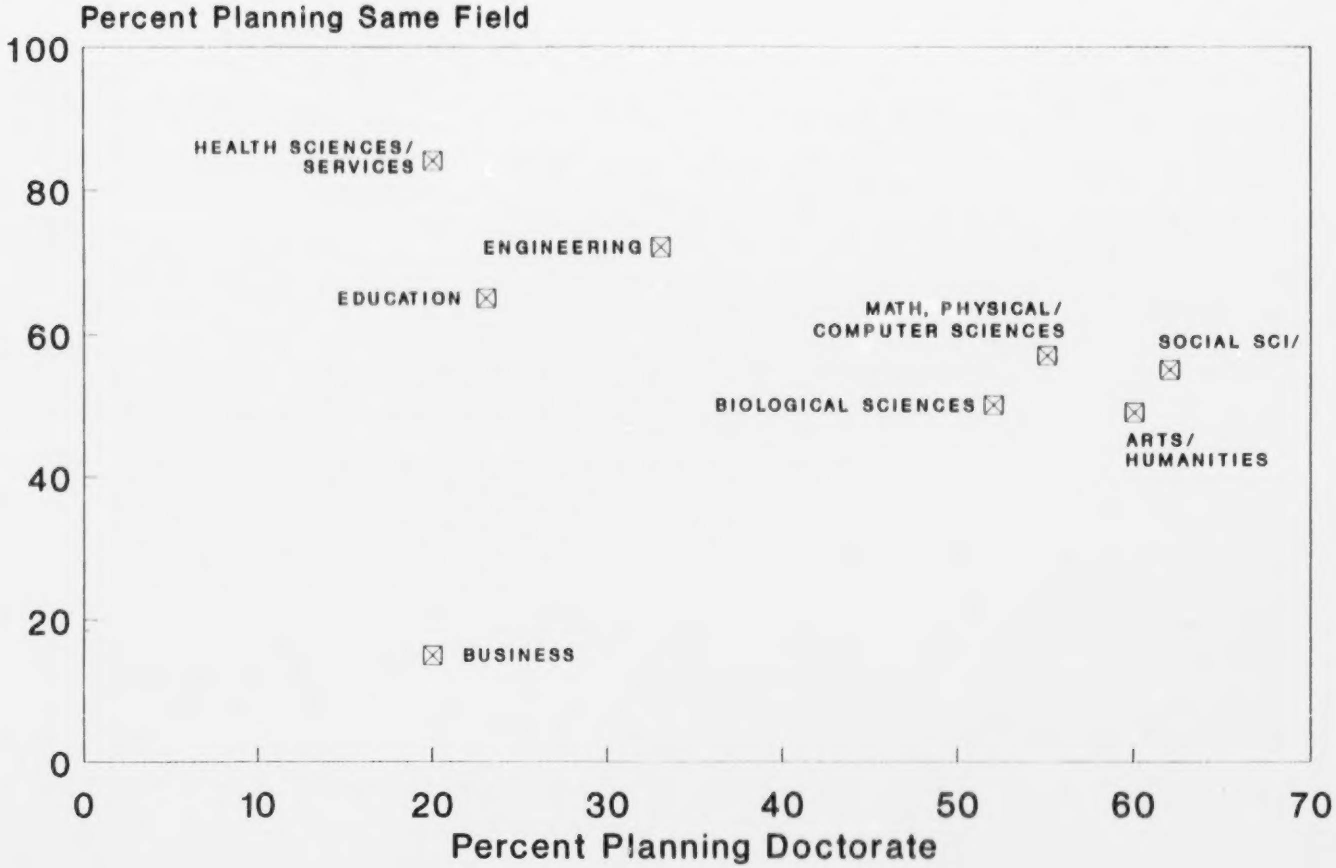

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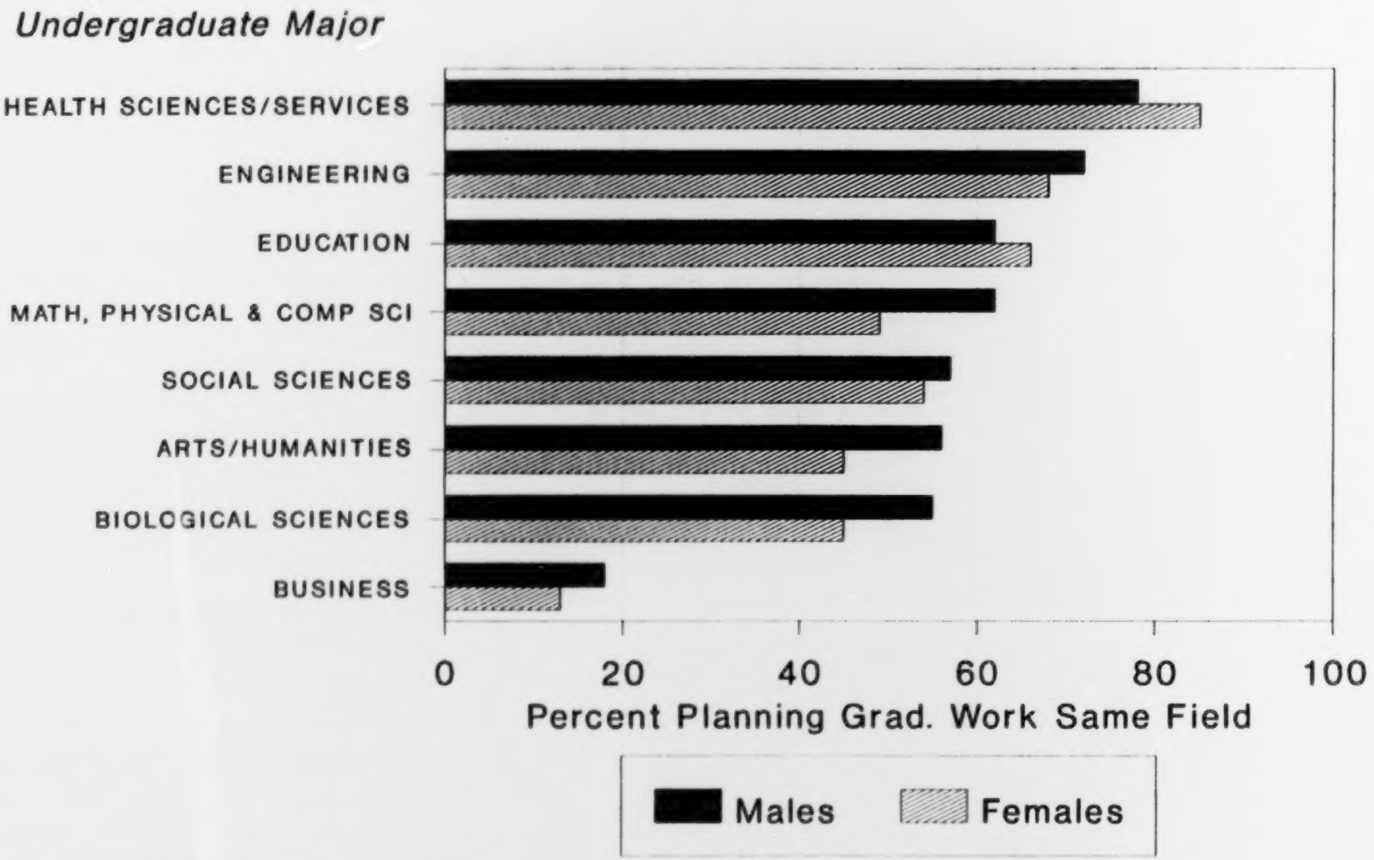
Figure 12: Holding Power of Eight Groups
of Academic Disciplines for 1993
by Gender



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Differences between Examinees Who Change Fields and Those Who Do Not

This section of the report will make some generalizations about examinees who changed fields (referred to as "changers") and examinees who did not (referred to as "nonchangers"). It would be naive to suggest that changers and nonchangers form homogeneous groups, or that a person changing from business to education is in any way like a person changing from physics to engineering. Nevertheless, we have examined some general statistics and will report them here. More informative, perhaps, are analyses of change for particular academic areas, to be discussed later.

Female examinees were somewhat more likely to change fields than were male examinees. In 1993, 44.2% of females and 40.6% of males switched from one broad area of study to another. These figures do not include people who shifted to another field within the broader area. For example, if one switched from an English major to graduate study in Spanish, the decision was not treated as a change because the person continued in arts and humanities. A switch from English to archaeology would be treated as a change because the person would go from arts and humanities to social sciences.

There were also small differences among ethnic groups, with the most frequent changes occurring among African American examinees and the least frequent among Mexican Americans. The following table shows the percentage of each ethnic group planning to change fields in 1993.

Ethnic Group	Percent Planning to Change
African American	47.1
Other Hispanic	43.6
White	42.6
Asian American	41.7
Puerto Rican	41.5
Native American	41.5
Mexican American	40.6

On average, changers were slightly older than nonchangers, by about one year. In the survey of older science and engineering students, we found a correlation between age and the proportion of examinees changing fields (Grandy, in preparation). A closely related and more directly relevant variable is "time since bachelor's degree." The longer examinees are out of college, not surprisingly, the more likely it is they will study something different if they return to graduate school. It is in this category that we find career changers. The distribution of time since bachelor's degree, like the distribution of ages, was highly skewed. On average, however, changers had been out of school 4.2 years; nonchangers had been out 3.0 years. The effect size of this difference was 0.21.[9]

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[9] The effect size is the difference in means of two groups divided by their pooled standard deviation. Thus, a **d** = 0.5 between males and females would indicate that their means differ by half a standard deviation. Cohen (1988) regards an effect size around 0.8 as "large," 0.5 as "medium," and 0.2 as "small."

There were fairly large differences in the degree objectives of changers and nonchangers. In 1993, only 35% of examinees planning to earn a doctorate were changers. In contrast, 48% of those planning to earn a master's degree were changers. Of the relatively small group of examinees who did not plan to earn any degree (N = 681), 63% were changers.

In studies of GRE examinees in mathematics, natural sciences, and engineering, we found a small but significant relationship between the decision to change fields (i.e., to leave science and engineering) and the amount of time examinees had spent in community service during their last year of school (Grandy, 1992, and Grandy, in progress). Those who planned to leave science or engineering had spent more time in community service; those who planned to continue in science or engineering were likely to have done no community service. The interpretation that seemed most obvious was that the more outgoing, socially oriented scientists had participated in some kind of community service or organization while in college. Then, having perhaps found their work or their studies either too isolating or not relevant to making a social contribution, they decided to apply to graduate school in a field that would train them to work with people.

This explanation worked very well for scientists and engineers, but we have found that in the GRE population as a whole, there is a relationship between community service and the decision to change fields. Of those who did at least some community service during the last year of college, 58.4% planned to change fields. Of those who did none at all, only 41.6% planned to change. It is not at all obvious how to interpret these findings, but there is no doubt that this is a large difference and it cannot be attributed to some special characteristic of scientists or their work.

Mean GRE scores of changers and nonchangers also differed, but by such a small amount that they are hardly worth reporting. Changers had slightly higher verbal and lower quantitative and analytical scores than did nonchangers, but the differences were only about 4 points. Four points corresponds to an effect size of about 0.03. Self-reported undergraduate GPAs also differ by a very small amount. For the GRE population as a whole, the GPA was very slightly lower (about 0.2 point) for changers than for nonchangers. This difference held for all three questions about GPA: overall GPA, GPA in major, and GPA the last two years of college. Differences in GPA in major had an effect size of 0.24.

These analyses all focused on differences between changers and nonchangers in 1993. In the next section, we examine 12-year trends in some important variables for changers and nonchangers, by academic area.

Patterns of Change for Each Academic Area

There is a limit to the generalizations that can be drawn about changers and nonchangers because there are considerable differences across academic areas. For this reason we have looked within each of the eight areas to identify differences between changers and nonchangers. In addition, we have examined trends in these differences.

Arts and Humanities. Looking first at academic indicators, we see from Figure 13a that people leaving the arts and humanities have verbal scores lower than those of people planning to continue. In 1982 there was no difference in the verbal scores of changers and nonchangers, but a difference developed and increased in magnitude over the 12-year period, so that by 1993, their score averages

Figure 13a: Arts and Humanities,
Trends in GRE Scores
of Changers versus Nonchangers

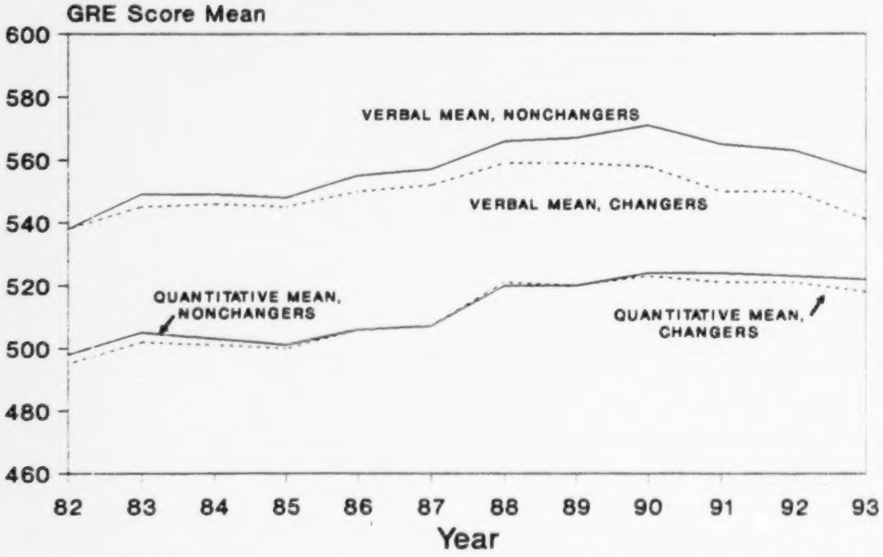

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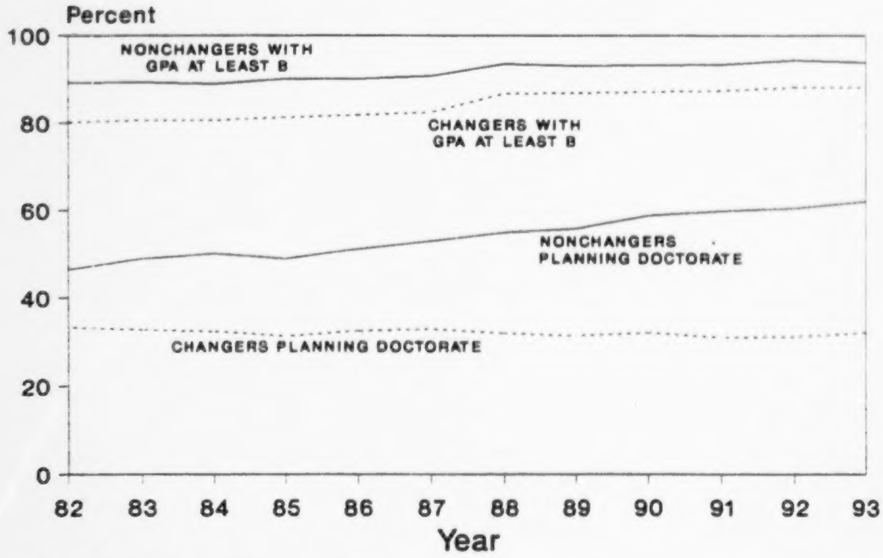
Figure 13b: Arts and Humanities,
Trends in Percent Planning a Doctorate
and Percent with GPA at Least a B



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differed by 15 points. Although this is not a large difference, it has been progressive. Quantitative score averages of changers have remained about the same as averages of nonchangers throughout the period.

Figure 13b shows considerable differences between changers and nonchangers in the percentages reporting that they earned at least a B average in their major and the percentages planning to earn a doctorate. There was a small but fairly constant difference in average reported GPA between changers and nonchangers, with changers reporting the lower GPA. There was a striking trend in the percentages planning to earn doctorates. Increasing numbers of examinees continuing in arts and humanities planned to earn doctorates, but decreasing numbers of changers planned to do so.

The picture that emerges from this information is that increasing numbers of arts and humanities graduates having lower verbal ability and lower grades than their colleagues have are choosing to leave their fields for graduate school. They are more likely to plan to earn a master's degree in some other field. The field they choose most often is education. In 1993, 12% of arts and humanities majors planned to study education at the graduate level; their average verbal scores were 513, which was 43 points lower than the average score of examinees continuing in the arts and humanities.

It is important also to point out that some of the people leaving arts and humanities had higher test scores and planned to enter social sciences and physical sciences. Though their numbers were small, some examinees with very high quantitative and verbal scores switched to mathematics, physical sciences, and computer sciences.

There were also demographic differences between changers and nonchangers. As we saw earlier, female examinees were more likely to leave arts and humanities than were male examinees. In 1993, not quite 9% of male arts and humanities majors switched to education, compared with 14% of females. Seven percent of both males and females switched to social sciences. More females than males switched to health sciences and services and to other fields.

Between 1982 and 1993, the number of arts and humanities examinees who identified themselves as American Indian or Native Alaskan only increased from 196 to 210. That slight rise in absolute numbers actually represented a decrease from 0.68% to 0.46% of the GRE population of U.S. citizens. Of these small numbers, about half planned to switch majors for graduate school, and the most frequent field choices were also education and social sciences.

The number of African American examinees in arts and humanities rose from 1,232 to 2,002 (from 4.26% to 4.37% of the examinee population) over the 12-year period. The proportion of African American examinees planning to continue in arts and humanities showed a small decline, however, from 42% in 1982 to 39% in 1993. In 1993, 17% planned to switch to education.

Mexican Americans increased as a proportion of the arts and humanities population from 1.09% in 1982 to 1.63% in 1993. The number planning to continue in arts and humanities also increased from 40% to 50%. Only 17% planned to switch to education in 1993 compared to 23% in 1982.

The percentage of arts and humanities majors who were Asian American more than doubled over the 12-year period, and almost half planned to continue in these fields. Those who did switch majors tended to choose social sciences more often than education or other fields.

Puerto Rican examinees constitute a very small part of the arts and humanities population, though their numbers increased from 205 to 391 over the 12-year period. More than half of Puerto Rican arts and humanities majors planned to continue in their fields for graduate school, and those who changed majors also chose education most frequently.

The percentage of other Hispanics in arts and humanities increased from 1.00% to 1.77% of the GRE population, and about half planned to continue in their field. Those who changed switched to education most frequently.

Mathematics, Physical Sciences, and Computer Sciences. Just as arts and humanities majors were more likely to change majors if their verbal scores were low, examinees in the highly mathematical sciences were more likely to change if their quantitative scores were low. From Figure 14a, we see that in 1982, there were no score differences between changers and nonchangers. Steadily a difference grew. By 1993, changers had verbal means 13 points lower and quantitative means 24 points lower than those of nonchangers.

Figure 14b shows that over the 12-year period, changers tended to have lower grades in their majors. Changers were also less likely to be planning to earn a doctorate. As the number of nonchangers planning to earn a doctorate increased over the 12-year period, the number of changers planning to earn one declined slightly.

In 1993, 57% of math/science majors planned to continue in their fields. Changers were spread over all other fields, the most common being education (7%) and engineering (6%). An interesting observation is that those who changed to arts and humanities had high verbal scores and high quantitative scores. In 1993, the average verbal score of mathematics, physical science, and computer science majors continuing in their field was 529, and their average quantitative score was 662. A small number--only 166--switched to arts and humanities. The average verbal score of these students was 603--a full 74 points higher than the bulk of their colleagues. Furthermore, their quantitative average was actually 5 points higher than the mean score of math/science majors continuing in their field. Whatever thought we might have that people leave a highly technical field because they do not have the academic skills to succeed seems well refuted by these statistics.

Clearly, however, many do leave for that reason or at least partly for that reason. Most people leaving math/science had quantitative scores at least somewhat lower than those of people continuing. Those switching to health sciences and services and to business had the lowest quantitative scores, but they still averaged over 600. Verbal scores of those transferring to education and business were more than 100 points lower than those of students transferring to arts and humanities.

Female math/science majors were more likely to change fields than were males. In 1993, 62% of males and 49% of females planned to continue in math/science for graduate school. Among males planning to change fields, 7% planned to switch to engineering and 4% to education. Females switched to education in far greater numbers: 11% to education, 6% to biological sciences, 5% to engineering, and 5% to health sciences and services.

Figure 14a: Math, Physical Sciences, & Computer Sciences: Trends in GRE Scores of Changers versus Nonchangers

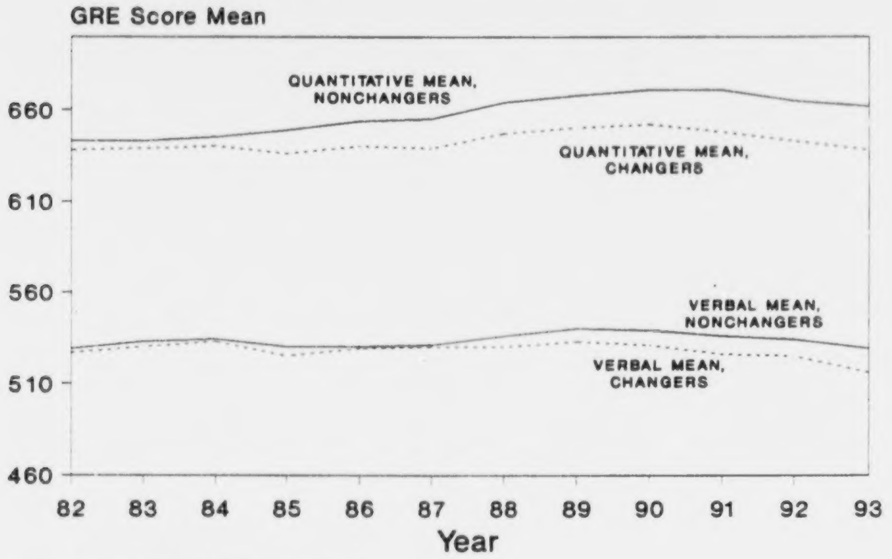

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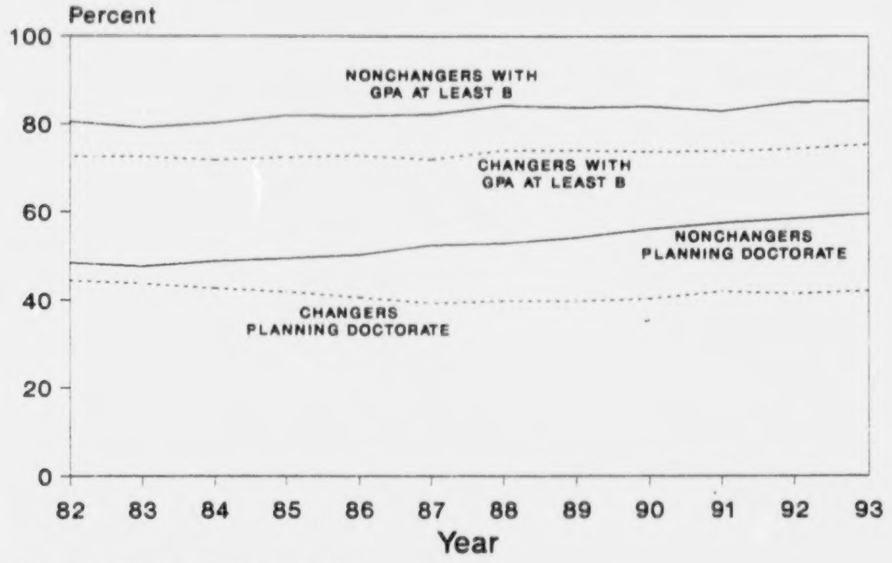
Figure 14b: Math/Physical Sciences, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



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Minorities in mathematics, physical sciences, and computer sciences show considerable differences, depending on their specific ethnic group. The number of American Indians was 85, in both 1982 and 1993. Over half planned to continue in math/science, and the remainder switched most frequently to education and health sciences and services.

The number of African Americans earning degrees in mathematics, physical sciences, and computer sciences grew dramatically from 581 to 1,415 during the 12-year period. This amounted to an increase from 3.92% to 7.95% of the population of math/science majors taking the GRE. The percentage who planned to continue in math/science for graduate school declined, however, from 60% to just 49%. Those changing fields chose engineering (9%) and education (9%) most frequently.

Mexican American math/science majors also increased from a mere 97 in 1982 to 196 in 1993. That amounts to an increase from 0.65% to 1.10% of the population of math/science examinees. The number planning to continue in math/science also rose slightly, from 58% to 60%. Examinees changing fields chose education most frequently (11%).

Asian American examinees display a somewhat different pattern from that of other groups. Rising from 2.91% to 4.91% of the population of math/science examinees,[10] Asian Americans also had among the highest percentages planning to continue in their fields. In 1993, 57% planned to remain in math/science; 8% planned to switch to engineering, and 5% to biological sciences. Fewer than 4% planned to study education.

The number of Puerto Ricans in math/science rose only slightly and remained just barely over 1% of the population of math/science majors. The percentage planning to continue in their field dropped from 69% in 1982 to 55% in 1993. However, there was a considerable increase in the number who did not specify a graduate field of study, and that may account for some of the decline. Of those switching fields, 8% changed to biological sciences, 7% to engineering, 7% to health sciences and services, and 6% to education.

As a percentage of the population of math/science examinees, other Hispanics increased from 0.65% to 1.21%, and perhaps tied with African Americans as the fastest growing of all minority groups in these fields. Among other Hispanics, there was a sharp increase in the number who did not specify a graduate field of study: from 5% to 18%. In 1993, 54% planned to continue in math/science. Most frequently, the others changed to engineering (8%) and education (5%).

Engineering. Unlike examinees in the fields just discussed, examinees in engineering were more likely to switch majors if their verbal scores were slightly *higher* than those of their colleagues. See Figure 15a. The differences in score means between changers and nonchangers were not large, but they were highly consistent for all 12 years. Each year, people leaving engineering had verbal scores averaging about 12 points higher than the average for people continuing in engineering. Changers had quantitative scores averaging about 20 points lower.

Another observation worth noting is that engineering graduates, as a whole, have a greater difference between their verbal and quantitative scores than do people in other fields. Among those

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[10] These percentages may appear lower than expected because the population of Asian American examinees in these analyses include only U.S. citizens.

Figure 15a: Engineering Majors, Trends in GRE Scores of Changers versus Nonchangers

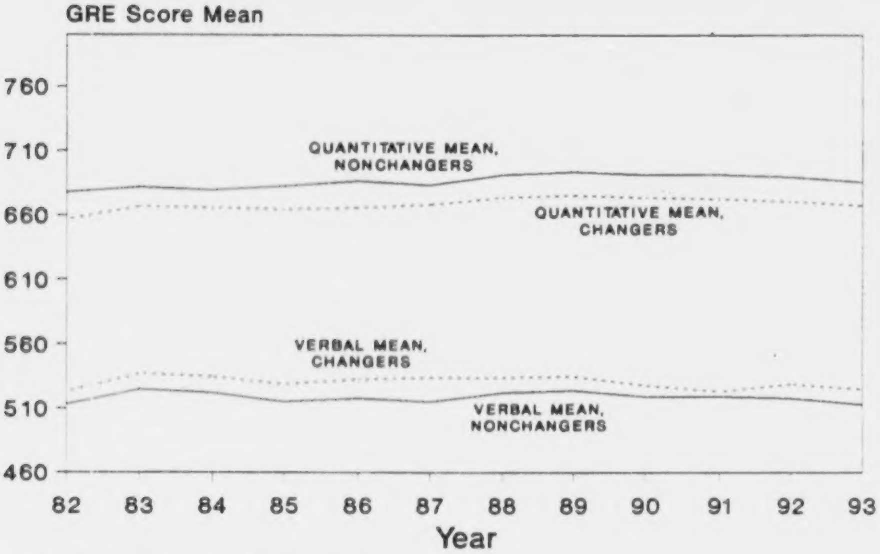

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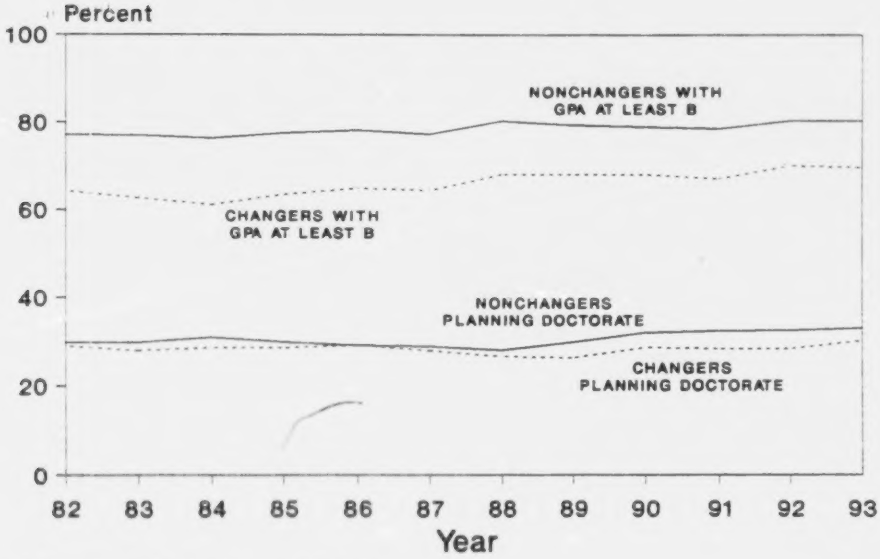
Figure 15b: Engineering Majors, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



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examinees changing fields, there is less of a difference between verbal and quantitative abilities. Averaged over the 12-year period, nonchangers had quantitative scores about 170 points higher than their verbal scores; changers had scores differing by about 140 points.

Considerably fewer changers than nonchangers reported having a GPA in their major of at least a B (Figure 15b). They differed by 10 to 12 percentage points.

Fewer than one third of engineering graduates planning to attend graduate school planned to earn a doctorate, regardless of whether they planned to continue in engineering or to change fields. A slightly greater number of nonchangers than changers planned to earn a doctorate.

In 1993, 72% of test takers in engineering planned to continue in engineering. Engineering has the second greatest holding power of any of the eight major-field areas. Less than 5% switched to mathematics, physical sciences, or computer sciences, and the remainder were distributed over the other areas. Education did not attract a sizable number of engineers as it did examinees from other major fields. Just over 1% of engineers switched to education in 1993.

Although there is a large difference between the average verbal and quantitative scores of engineering students, their verbal scores are by no means low. In fact, examinees earning (or having earned) bachelor's degrees in engineering have mean scores higher than those of examinees in all other areas except arts and humanities and mathematics, physical and computer sciences. It appears to be the *relative* strength of their verbal and quantitative skills that is associated with their choice of graduate major. Consider the scatterplot in Figure 16 showing the 1993 mean verbal and quantitative score combinations of examinees with undergraduate majors in engineering, planning graduate work in eight different areas of study. Keep in mind that ALL of the examinees represented in the graph have *undergraduate* majors in engineering.

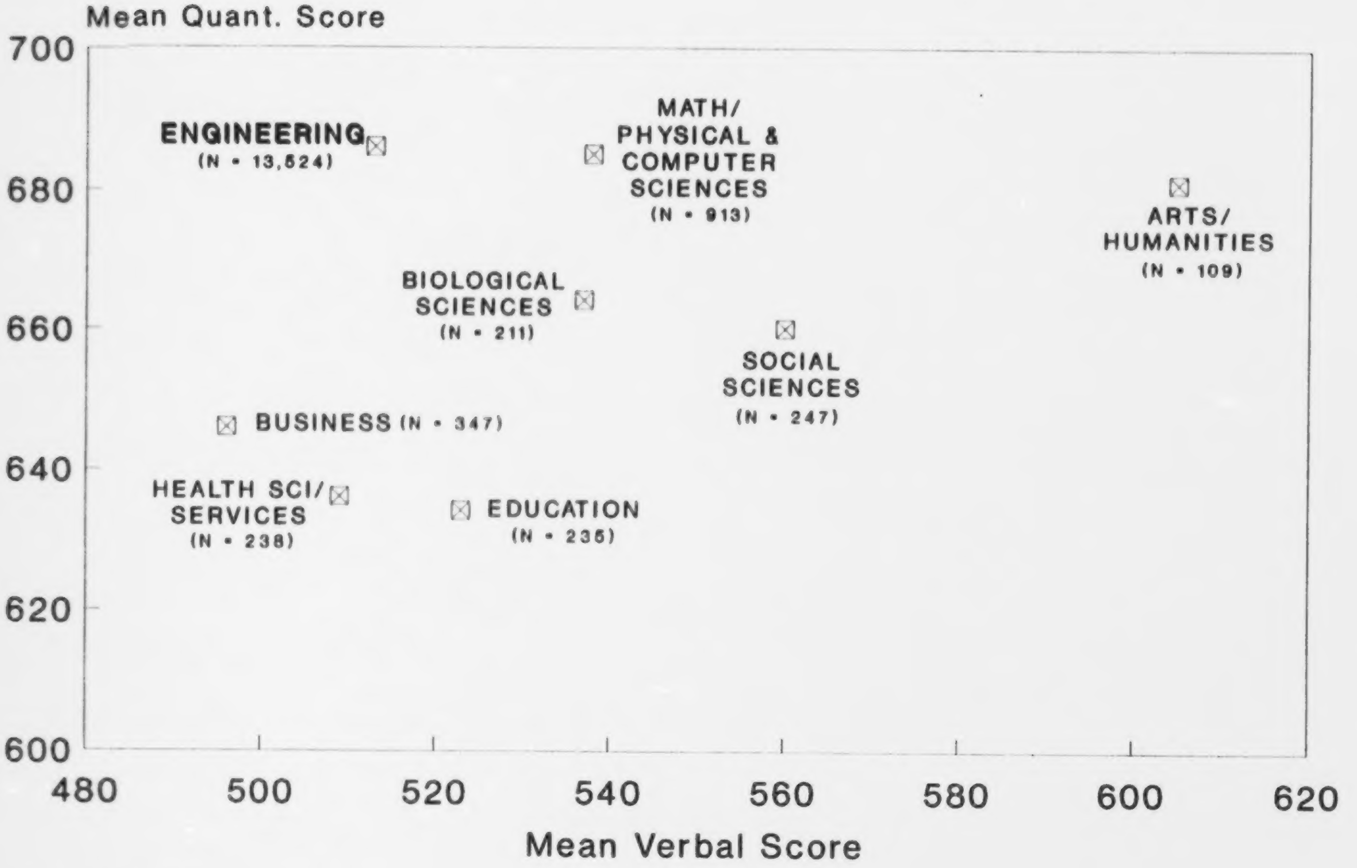
Examinees continuing in engineering have, on average, high quantitative scores and relatively low verbal scores (upper left point on graph). Those switching to arts and humanities have high verbal and high quantitative scores (upper right point on graph). Examinees switching to social sciences have both scores about in the middle (near center of graph). It is easy to see graphically how the relative strengths of verbal and quantitative skills compare among all eight areas of intended graduate study.

Engineering still ranks first as the area dominated by male examinees. Between 1982 and 1993, the percentage of engineering examinees who were female rose from 14% to 19%. Even in 1993, a greater percentage of females than males planned to leave engineering (32% versus 28%, respectively). Females were somewhat more likely than males to switch to education and to health sciences and services.

Persistence rates in engineering were quite high for all minority groups in 1993. Among White examinees with undergraduate majors in engineering, 71% planned to continue in engineering. Except for African American examinees, whose persistence rate was very slightly lower (69%), all minority groups showed a slightly higher persistence rate than did Whites.

Between 1982 and 1993, the number of American Indian examinees having degrees in engineering only rose from 53 to 58, but the percentage who planned to continue in engineering increased from just 57% to 74%.

Figure 16: Verbal and Quantitative Means of Examinees in Engineering, Showing Intended Area of Graduate Study



Based on 1993 GRE data

The number of African American engineering examinees more than quadrupled between 1982 and 1993. As a percentage of the population of U.S. citizens taking the GRE and having undergraduate majors in engineering, they increased from 3.24% to 5.46%. The proportion who intended to continue in engineering dropped just a very slight amount, from 72% to 69%, probably not enough to indicate a real decline.

The number of Puerto Ricans in engineering also rose considerably, from 104 in 1982 to 273 in 1993. That represents an increase from 1.11% to 1.44% of the examinee population in engineering. The number planning to continue in engineering dropped from 85% to 77%.

The population of Asian Americans in engineering is not only high but continues to grow. Between 1982 and 1993, Asian Americans increased from 6.93% to 10.33% of the GRE population having an undergraduate major in engineering. The number planning to continue in engineering remained very high, declining only a few percent, from 79% to 75%.

Mexican American representation in engineering also increased over the 12-year period, from 1.25% to 1.77% of the GRE engineering population. In 1993, fewer than 20% of Mexican Americans planned to leave engineering for some other area of graduate study.

Other Hispanics constituted 1.21% of the GRE engineering population in 1982; this figure rose to 1.85% by 1993. The percentage planning to continue in engineering remained around 74%.

Biological Sciences. In 1993, 50% of examinees in biological science planned to continue in that area. Twenty-three percent planned to change to health sciences and services. Four percent planned to switch to education.

Figure 17a shows that until about 1988 or 1989, there were not large differences between the test scores of changers and nonchangers. After that time, the scores diverged, with changers scoring lower on both tests, on average. Just why the scores of changers should begin a decline cannot be known for certain from inspecting the graph. By examining trends in the number of changers, we find that the percentage of biological sciences majors that switched fields increased from 45% to 50%. Because most changers switched to health sciences, and because they had lower scores than people remaining in biological sciences, at least some of the divergence can be explained by the increasing number of lower scoring individuals switching to health sciences.

Consistent with the lower test scores of changers were the lower grades and degree aspirations. Figure 17b shows that by 1993, 54% of nonchangers and only 40% of changers planned to earn a doctorate. Eighty-one percent of nonchangers reported having a GPA in their major of at least a B; only 75% of changers had so high an average.

There was a considerable range in the verbal score averages of test takers switching to other fields. Those entering arts and humanities had a mean verbal score of 601; those switching to business had a mean of only 465. The largest number changing fields switched to health sciences and services. That group scored an average of 483, which was 22 points lower than the average for test takers continuing in biological sciences.

Figure 18 shows a scatterplot similar to the one for engineers. It is easy to see that biological sciences majors changing to health sciences and services had lower scores, both verbal and

Figure 17a: Biological Science Majors, Trends in GRE Scores of Changers versus Nonchangers

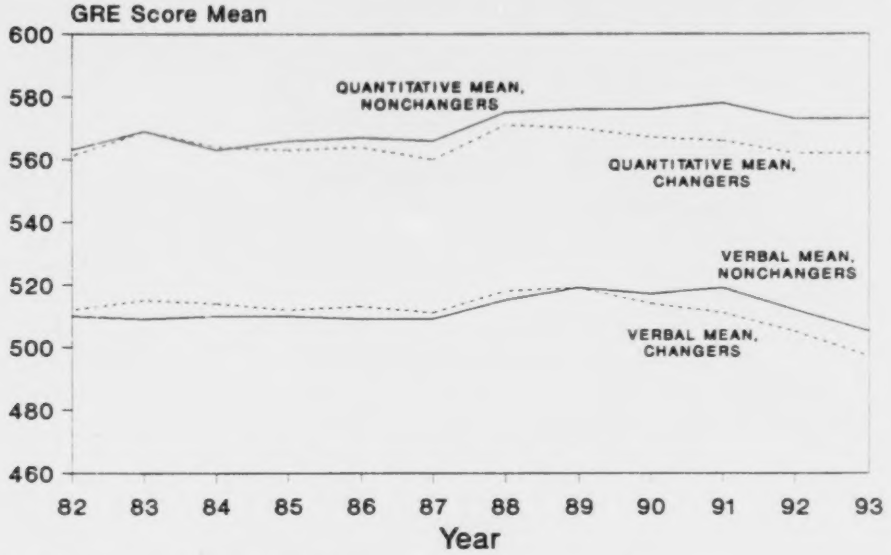


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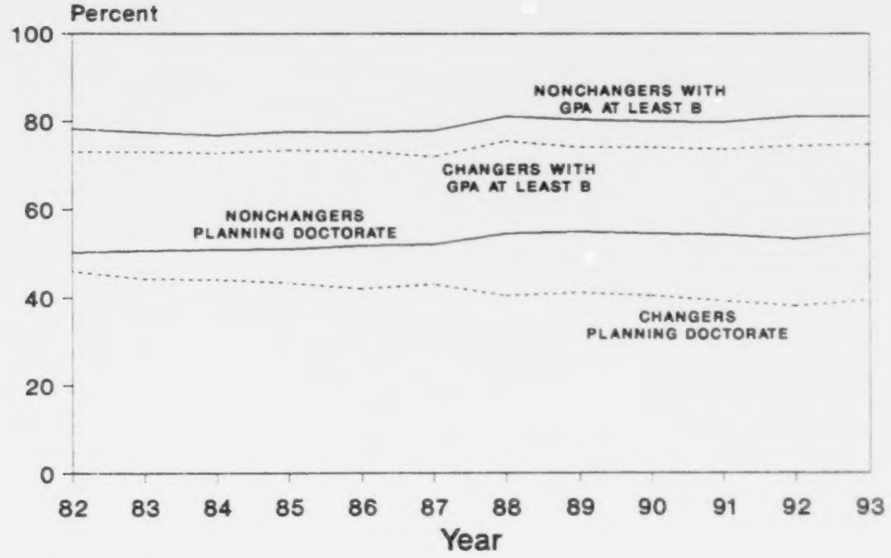
Figure 17b: Biological Science Majors, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



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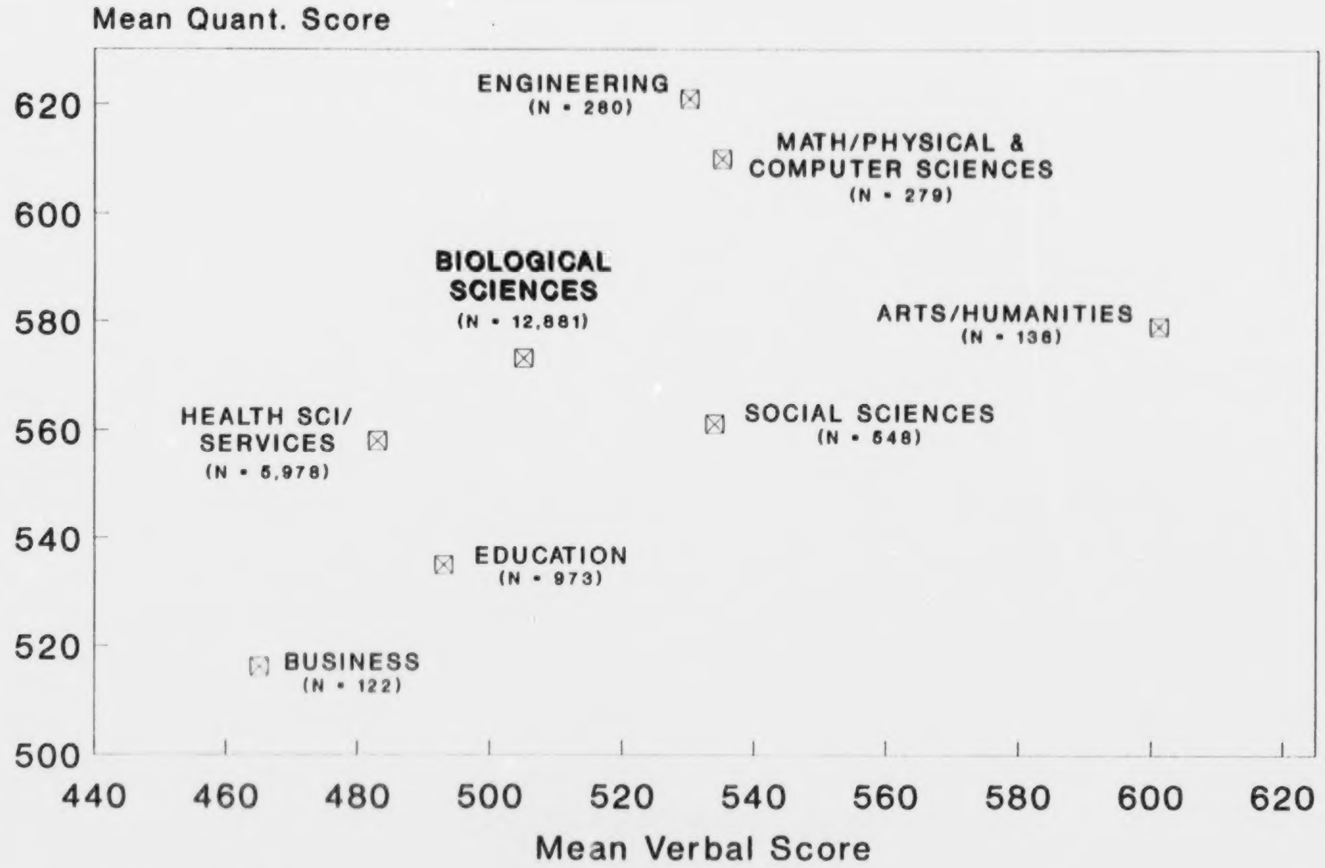

Figure 18: Verbal and Quantitative Means of Examinees in Biological Sciences, Showing Intended Area of Graduate Study

Based on 1993 GRE data

quantitative, than those continuing in biological sciences. But they did not have scores as low as those of students switching to business. The small number switching to arts and humanities had much higher verbal scores and about the same quantitative scores. Those changing to engineering or the math/science area had much higher quantitative scores, as we might expect, and somewhat higher verbal scores as well.

No longer a field in which females are underrepresented, the biological sciences can boast that in 1993, 57% of the GRE population having undergraduate majors in biological sciences were female. Still, females transfer out of biological sciences at a higher rate than do males. Fifty-five percent of males and only 45% of females planned to continue in biological sciences. The majority of both males and females changing fields switched to health sciences and services, but the number of females was much higher than the number of males. Twenty-eight percent of females planned to switch to health sciences and services, compared with 17% of males.

The number of American Indians with undergraduate majors in biological sciences declined from 162 to 128 over the 12-year period. In addition, the proportion of biological sciences majors who switched to health sciences and services increased from 22% to 27% during that period.

The population of African Americans grew from 4.47% to 5.08% of all examinees in biological sciences. In 1993, fewer than half planned to continue in biological sciences; the greatest numbers switching to health sciences and services (24%), and education (6%).

Among Puerto Rican test takers, the numbers in biological sciences rose very little, and the proportion switching to health sciences and services for graduate school rose from 11% to 27% over the 12-year period.

As a percentage of the GRE population with an undergraduate major in biological sciences, Asian Americans rose from 2.43% to 4.63%. An increasing number, from 22% to 25% planned to switch majors to health sciences and services. Slightly less than half planned to continue in biological sciences.

Mexican Americans, like most other minority groups, increased as a proportion of the GRE population of biological science majors. Approximately one half planned to continue in biological sciences and a fourth (24%) planned to switch to health sciences and services.

Other Hispanics in biological sciences also increased in numbers. In 1993, 45% planned to continue in their field, and 29% planned to switch to health sciences and services.

Social Sciences. Nearly one quarter of all examinees taking the GRE General Test have undergraduate majors in the area we have designated as social sciences. Although the percentages vary among subgroups, the social sciences supply more test takers than any other academic area. This holds true for every ethnic group and both genders.

Among majors in social sciences in 1993, 55% planned to continue in social sciences in graduate school. Figure 19a shows that throughout the 12-year period, the quantitative means of examinees planning to continue in social sciences was higher, on average, than the mean for those changing fields. Verbal means were, on average, about the same. It appears that the decision to change fields, therefore, may be more related to quantitative ability than to verbal ability. If that is

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Figure 19a: Social Sciences Majors,
Trends in GRE Scores
of Changers versus Nonchangers

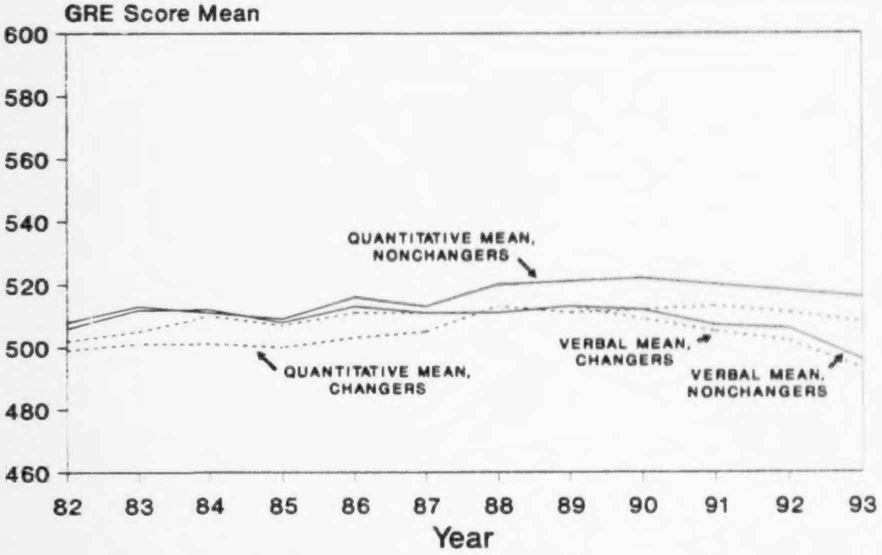

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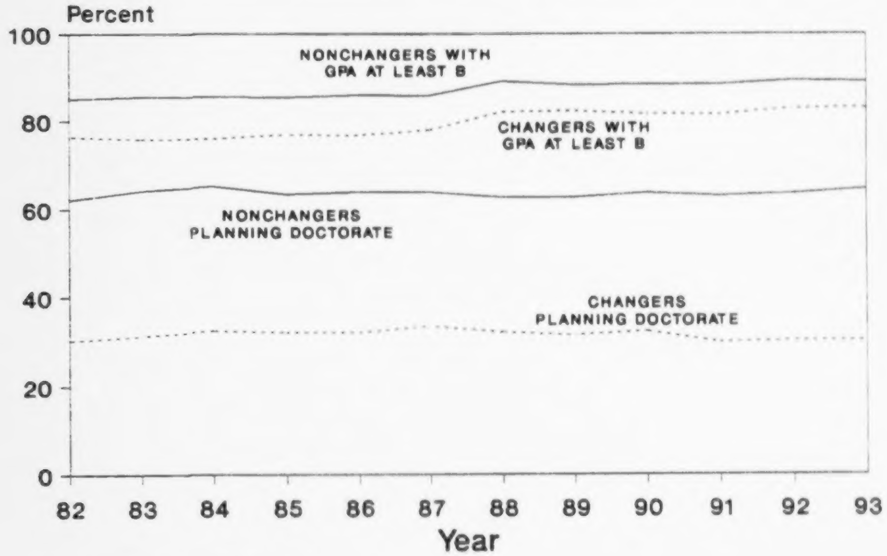
Figure 19b: Social Science Majors,
Trends in Percent Planning a Doctorate
and Percent with GPA at Least a B



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the case, undergraduate grades in social science subjects may also be more related to quantitative abilities than verbal abilities. Over the entire 12-year period, fewer changers than nonchangers reported having an average undergraduate GPA in major of at least a B. See Figure 19b.

There was a considerable difference in the percentages of changers and nonchangers planning to earn a doctorate. Throughout the 12-year period, more than 60% of the people planning to continue in social sciences planned to earn a doctorate; only about one third of the changers planned to do so.

Examinees changing fields in 1993 most frequently switched to education (9%) and health sciences and services (5%). Test takers switching to those fields had average verbal scores only 10 to 20 points lower than those of students continuing in social sciences. Higher scoring individuals tended to switch to the remaining fields--arts and humanities, math/physical and computer sciences, engineering, and biological sciences--but these were a small percentage of all social science majors.

The average quantitative score of social science majors continuing in their fields was 516. The average ranged from 485 for those switching to education to 611 for those few (N = 103) switching to engineering.

Among examinees with undergraduate majors in social sciences, females outnumbered males nearly two to one. Females switching fields were somewhat more likely to change to education and health sciences and services than were males. Males were more likely to switch to arts and humanities.

The number of American Indians majoring in social sciences and taking the General Test increased from 298 to 384 over the 12-year period, but in terms of the total social sciences population of test takers, they declined from 0.85% to 0.60%. The number planning to continue in social sciences remained at about 62%, with changers planning to switch primarily to education and health sciences and services.

The proportion of African Americans in social sciences increased slightly, from 7.96% to 8.44% of the test taker population. The percent planning to continue in social sciences declined slightly, from 56% in 1982 to 52% in 1993. The majority of those leaving switched to education. In 1993, 12% followed that pathway.

The percentage of Puerto Rican examinees with undergraduate majors in social sciences declined slightly, from 1.13% to 0.93% of the test-taker population. The percentage continuing in social sciences dropped slightly, from 64% to 61%, with about 8% planning to switch to education.

In contrast to the physical sciences and engineering, social sciences are fields in which Asian Americans are underrepresented. Over the 12-year period, the Asian American share increased from 1.70% to 3.08% of the population of examinees in social sciences. This increase, however, was less than one might expect based on the growth of Asian Americans in the test-taking population. Furthermore, the holding power of social sciences for Asian Americans declined from 58% to 52%, a decline similar to that seen for social sciences among all examinees. Most Asian Americans who changed fields switched to education or health sciences and services, just as members of other groups did.

Mexican Americans in social sciences grew from 1.47% to 2.04% of the population of social sciences test takers. The number planning to continue in social sciences actually increased somewhat, from 52% to 56% over the 12-year period. In 1993, the majority of changers, 12%, switched to education.

As the number of other Hispanic examinees in the GRE population more than tripled, their share of the population of test takers in social sciences grew from 1.14% to 2.04%. Relatively high percentages of those in social sciences planned to continue in their fields: 67% in 1982 and 59% in 1993. Like social science majors changing fields, most planned to switch to education (8%) and health sciences and services (5%).

Health Sciences and Services. As we saw earlier, health sciences and services had the greatest holding power of all academic areas. In the 1993 GRE files, 84% of the majors in these fields planned to go on and study health sciences and services at the graduate level, though generally seeking a master's degree. The small percentage planning to change fields most frequently chose education.

The test scores of examinees in this area showed a decline over the 12-year period. See Figure 20a. Among those continuing in health sciences and services, average verbal scores declined 28 points, from 482 to 454. Quantitative scores declined 11 points. Changers had higher mean scores, both verbal and quantitative, though theirs too showed a decline. Like examinees in other fields, changers had, on average, slightly lower GPAs in major (Figure 20b).

A great many more of the test takers changing fields planned to earn a doctorate. In 1993, 29% of changers planned to earn a doctorate compared to less than 15% of the examinees continuing in their field. Numbers planning to earn a doctorate also declined over the 12-year period, both for changers and nonchangers.

Eighty-five percent of female and 78% of male test takers majoring in health sciences and services planned to continue in their fields in 1993. Males who changed fields most frequently selected biological sciences; females most often chose education.

Between 1982 and 1993, the number of American Indian test takers in health sciences and services increased in absolute numbers, from 108 to 119, but declined as a proportion of all test takers in that area. In 1993, 78% planned to continue in their field; those who changed most frequently switched to education.

The number of African Americans also increased, both in absolute numbers and as a proportion of all test takers in health sciences and services. In 1993, 75% planned to continue in their field; of the changers, 4% planned to switch to education and 3% to social sciences.

The percentage of Puerto Rican test takers increased slightly, from 0.57% to 0.72%. In 1993, 79% planned to continue in health sciences and services. Those who changed most frequently planned to switch to biological sciences (5%) and education (4%).

The percentage of Asian Americans also increased, from 1.43% to 2.29% of the population of test takers in health sciences and services. In 1993, 79% planned to continue in these fields; those changing chose biological sciences most frequently.

Figure 20a: Majors in Health Sciences and Services, Trends in GRE Scores of Changers versus Nonchangers

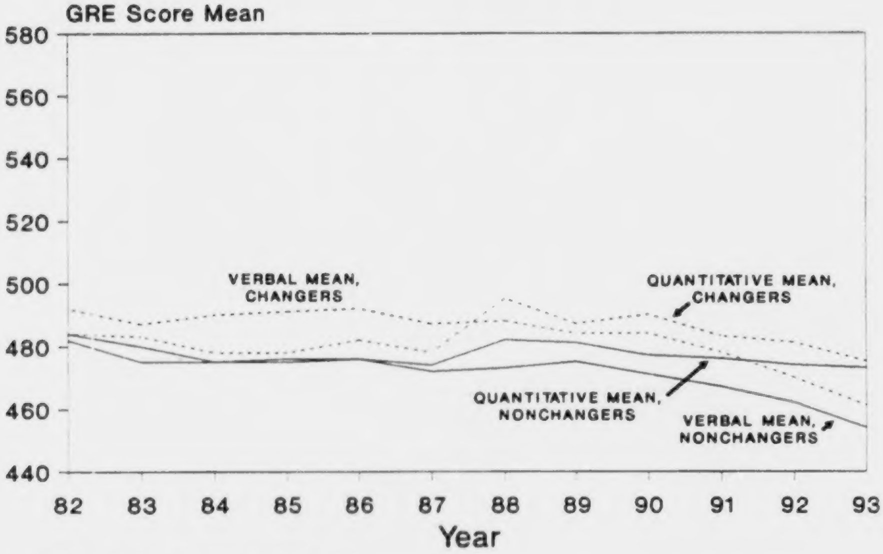

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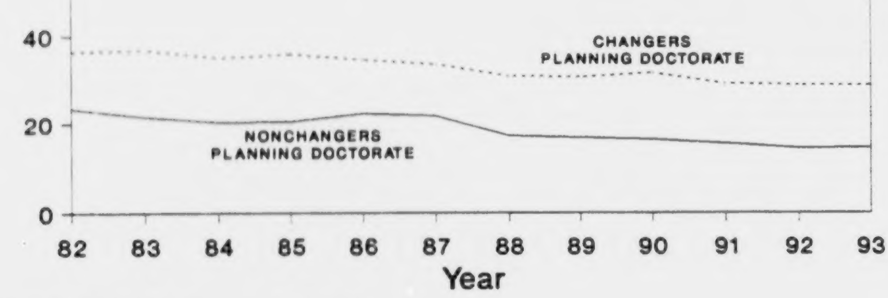
Figure 20b: Majors in Health Sciences, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



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As a percentage of the test taking population in these fields, Mexican Americans increased considerably over the 12-year period, from 0.83% to 1.42%, an increase greater than their population growth among GRE test takers. The percentage planning to continue in health sciences and services also increased, from just 68% in 1982 to 81% in 1993. Those planning to change fields most often chose education (5%) and biological sciences (2%).

All other Hispanics majoring in health sciences and services increased from just 71 test takers in 1982 to 225 in 1993, an increase from 0.56% to 1.10% of the examinee population in this area. In 1993, 82% planned to continue in their field; changers selected biological sciences (3%) and education (2%) most frequently.

Education. One might infer from previous discussion that education is an area INTO which people flow when their test scores and/or academic abilities are not high enough for them to continue in their original field of choice. In part, this appears to be true. But that is only half of the picture. Examinees also flow OUT of education at a fairly high rate. Unfortunately for the profession, those who leave education have higher average verbal and quantitative scores. Also unfortunate for the profession, the numbers leaving are quite high: approximately 10,000 education graduates each year plan to do graduate work in another area.

Figure 21a shows that over the 12-year period, on average, the GRE verbal scores of changers were consistently about 25 points higher than the scores of people continuing in education. The difference in mean quantitative scores was slightly less, but also consistent over the period. Each year, however, GPA in major was no different for changers than it was for nonchangers (Figure 21b). Similarly, there was very little difference between changers and nonchangers in the percentage planning to earn a doctorate. Changers were only a few percentage points higher than nonchangers in doctoral intention.

In 1993, 65% of education majors planned to continue in education. Those who planned to change chose health sciences and services (6%), social sciences (4%), and arts and humanities (3%) most frequently. Figure 22 shows the pattern of verbal and quantitative score combinations associated with graduate field chosen. So few education majors switched to engineering that their data were omitted from the graph.

It is evident from the graph that education majors planning to switch fields cover a considerable range in quantitative ability, so much so that the graph had to be plotted vertically to accommodate points for test takers switching to mathematics, physical sciences, and computer sciences at one extreme, and test takers continuing in education at the other extreme. The mean quantitative scores of the two groups differed by 172 points. Not surprisingly, education majors switching to arts and humanities had the highest mean verbal scores (but not as high as those of test takers with an undergraduate major in arts and humanities).

Among test takers with undergraduate majors in education, about 77% were female, and that figure varied little over the 12-year period. Furthermore, there was very little difference in the gender composition of changers and nonchangers, and little difference in their choice of graduate major. Females were somewhat more likely to switch to social sciences than were males, but otherwise, the choices were almost identical.

Figure 21a: Education Majors, Trends in GRE Scores of Changers versus Nonchangers

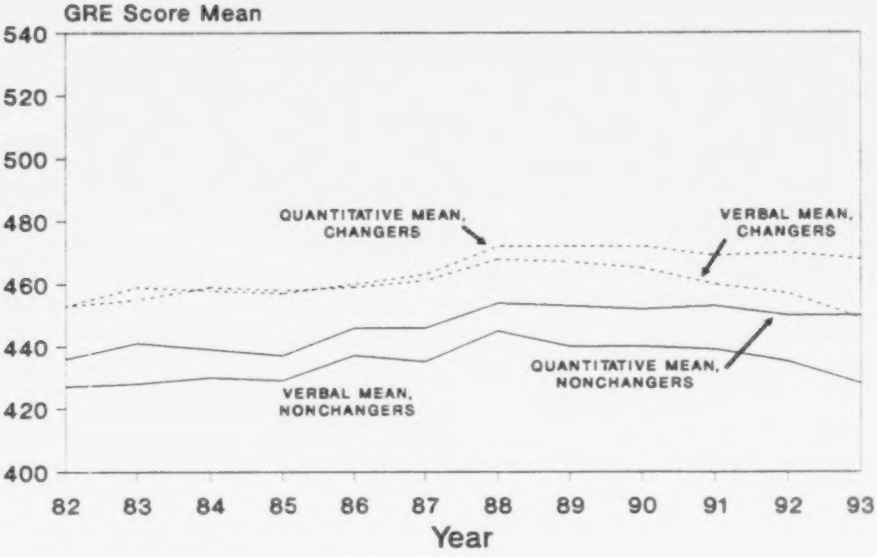

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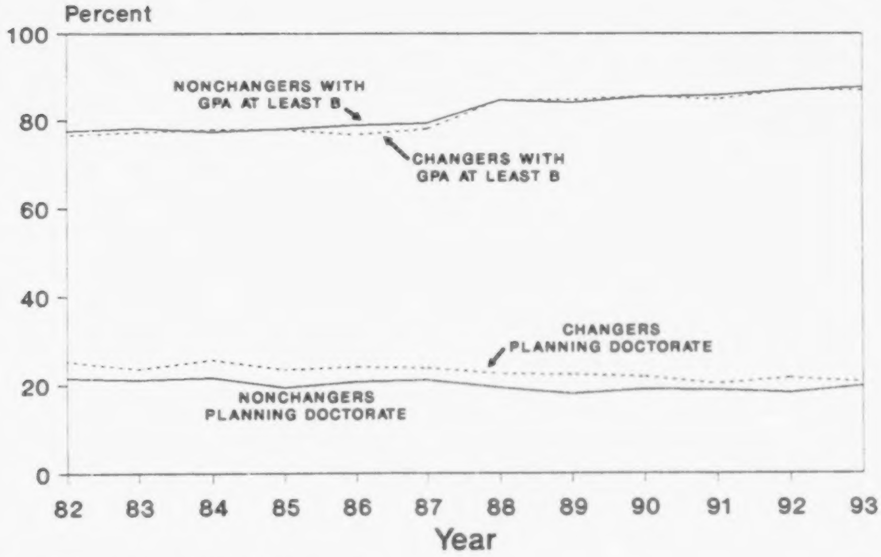
Figure 21b: Education Majors, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



ALL U.S. CITIZENS TAKING THE GRE

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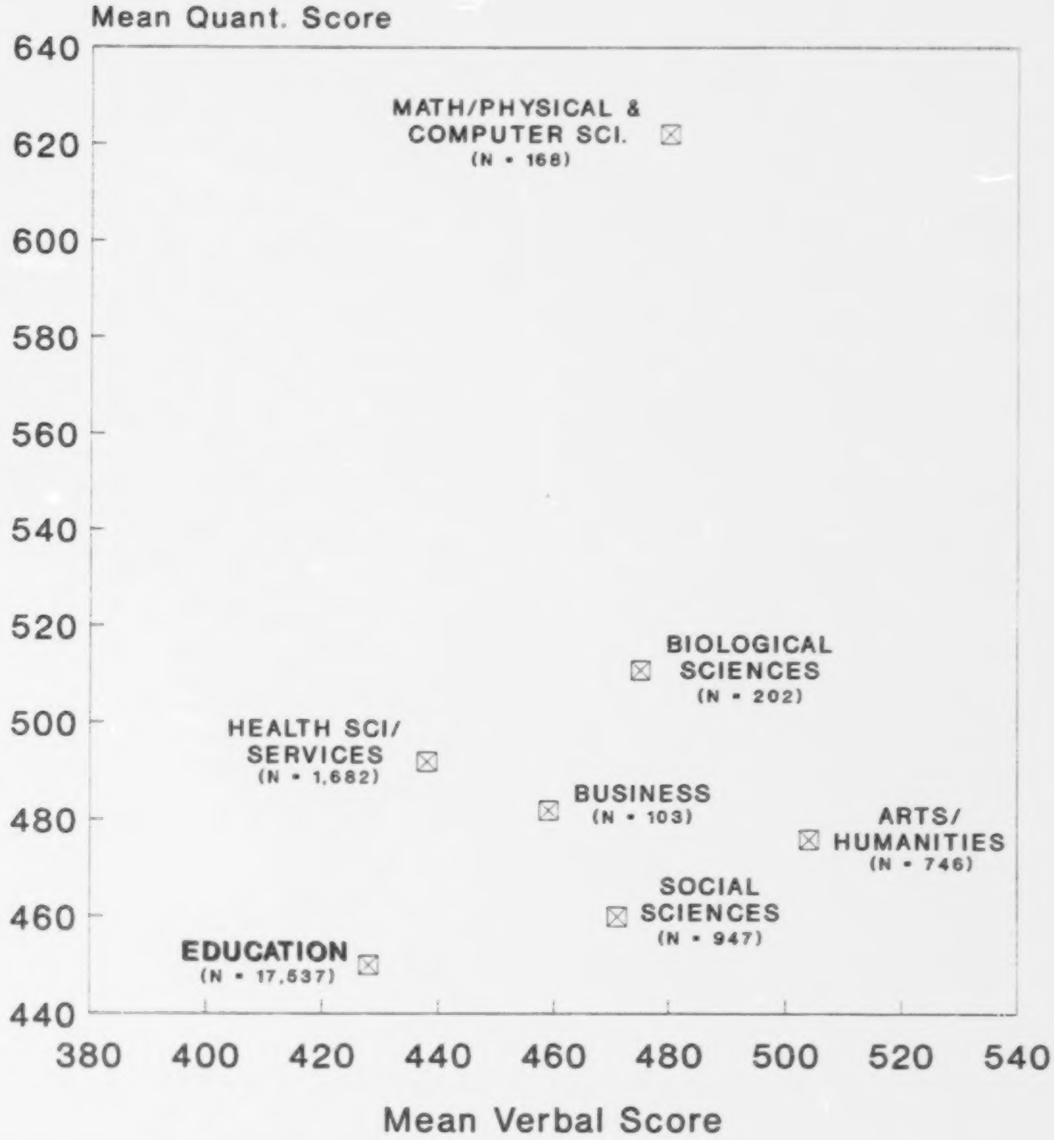
Figure 22: Verbal and Quantitative Score Means of Examinees in Education, Showing Intended Area of Graduate Study



Based on 1993 GRE data.
Engineering excluded because N only 28.

The number of American Indians majoring in education declined 20%, and their share of the GRE population of education majors decreased from 1.03% to just 0.60%. In 1993, 71% planned to continue in education; the remainder switched primarily to health sciences and services (5%), social sciences (4%), and arts and humanities (4%).

The percentage of African Americans majoring in education also declined from 8.24% to 6.27% of the examinee population. Of those changing fields in 1993, the majority switched to social sciences (4%) and health sciences and services (3%).

Puerto Rican examinees in education changed very little over the 12-year period. In 1993, 64% planned to continue in education. Seven percent planned to change to arts and humanities, 6% to health sciences and services, and 4% to social sciences.

As in the past, Asian Americans continue to be underrepresented in education and overrepresented in engineering and the physical sciences. As the total number of Asian Americans taking the GRE nearly tripled between 1982 and 1993, their share of the total test-taking population grew from 1.92% to 3.36%. Nevertheless, they still constitute less than 1% of the education majors. In 1993, 58% of the Asian American education majors planned to continue in education; 12% planned to switch to health sciences and services, 3% to arts and humanities, and 3% to social sciences.

The proportion of Mexican Americans in education was about the same in 1993 as in 1982. In 1993, 72% planned to continue in education; 4% planned to switch to health sciences and services.

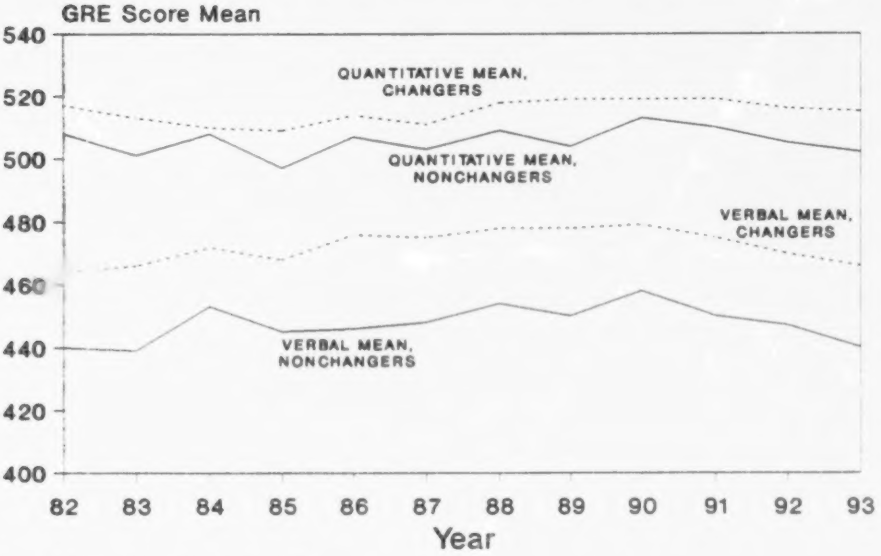
The percentage of other Hispanics in education increased from 0.73% to 1.36% of the examinee population. In 1993, 69% planned to continue in education, 6% planned to switch to arts and humanities, and 4% each to social sciences and health sciences and services.

Business. Business majors who take the GRE are probably not typical of business majors planning to pursue a higher degree. Those intending to earn an MBA would typically take the GMAT, not the GRE. The vast majority of business majors taking the GRE plan to switch fields for graduate school. Between 1982 and 1993, the number planning to continue in business dropped from 29% to 15%.

In 1993, 19% of the business majors planned to switch to education, 13% to social sciences, 9% to health sciences and services, 4% to arts and humanities, and 3% to mathematics, physical sciences, and computer sciences. Examinees planning to change fields had, on average, higher verbal and quantitative scores than examinees continuing in business, over the entire 12-year period (Figure 23a). There was very little difference, however, between changers and nonchangers in GPA in major except over the last 4 years, when changers has slightly lower grades (Figure 23b). A slightly higher number of changers than nonchangers planned to earn a doctorate.

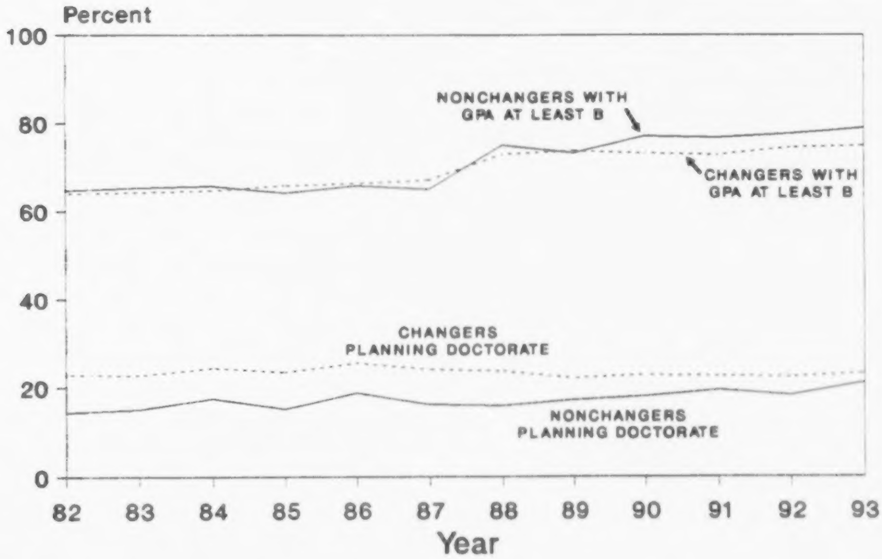
In 1993, just over half (52.5%) of examinees with an undergraduate major in business were female. A somewhat higher proportion of males than females planned to continue in business (18% versus 13%). Although both genders tended to switch to the same fields, there were considerable gender differences in the proportions switching to those fields. Fifteen percent of males and 23% of females planned to switch to education. The percentages choosing social sciences were about the same: 13% of males and 12% of females. Eleven percent of females chose health sciences and services compared with 8% of males.

Figure 23a: Business Majors, Trends in GRE Scores of Changers versus Nonchangers



ALL U.S. CITIZENS TAKING THE GRE

Figure 23b: Business Majors, Trends in Percent Planning a Doctorate and Percent with GPA at Least a B



ALL U.S. CITIZENS TAKING THE GRE

Very few American Indians majored in business, just 41 in 1982 and 64 in 1993. These numbers are essentially too small to generate any reliable statistics.

Along with the rest of the GRE population, the number of African Americans majoring in business and taking the GRE nearly tripled over the 12-year period, raising the percentage of African Americans from 11.34% to 12.88% of the population of business majors taking the GRE. During that time, the percentage planning to continue in business dropped from 37% to 20%. In 1993, 22% of the African American business majors planned to switch to education, 10% to social sciences, and 4% to health sciences and services.

The number of Puerto Rican test takers majoring in business increased from just 44 in 1982 to 128 in 1993. With such small numbers, additional statistics would not be reliable or useful.

The number of Asian Americans majoring in business and taking the GRE was also quite small, increasing from just 67 in 1982 to 261 in 1993. In 1993, 17% planned to continue in business; the remainder switched most frequently to education and social sciences.

Few Mexican Americans were attracted to business, especially in 1982, when the number was just 67.[11] By 1993, the number had risen to 198, as the Mexican American GRE population grew by about the same proportion. In 1993, 21% planned to continue in business; the vast majority of others planned to switch to education (27%).

The number of other Hispanic test takers majoring in business was also small, but rose from 24 to 164 over the 12-year period. Sixteen percent, in 1993, planned to continue in business, 22% planned to switch to education, and 20% planned to change to social sciences.

Use of the Database to Describe Specific Fields of Study

Throughout nearly all of this report we have presented and discussed examinees leaving and entering eight broad fields of study. The talent flow database allows us to study talent flow at a much more detailed level, with 86 fields plus an 87th category labeled "other." Having such specific fields of study enables us to do countless special analyses that may be regarded as case studies of particular major fields or of specialties within fields. It enables us to break down a broad area of study into its components if, for instance, we may wish to track examinees from a broad undergraduate area, such as biological sciences, into the specialties of that field--biochemistry, genetics, and so forth.

Having access to 87 major fields enables us to redefine the broad fields of study if so desired. Some investigators may wish to exclude history from the humanities and place it in the social sciences. Some may wish to study examinees majoring in foreign languages. Others may wish to define earth sciences separately from the physical sciences, or to remove computer sciences from the category that includes physical sciences and mathematics.

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[11] It is coincidental (and not an error) that the number of Asian American and Mexican American examinees majoring in business in 1982 was the same.

The ability to include or exclude specific fields from a group of fields is essential in studying talent flow. Are students lost from the science pipeline if they switch from chemistry to education? Perhaps not, if they plan to teach chemistry. Thus, the specific field of secondary education could be grouped with the sciences for the purposes of a science pipeline study.

In this section of the report we will present two examples of the use of specific major fields to study talent flow in 1993. The first compares the flow of general psychology majors into the most commonly selected graduate fields; the second illustration uses the same graphic technique to examine the relative verbal and quantitative abilities of veterinary medicine applicants who have undergone different programs of preparation.

Graduate Field Selections of Psychology Majors. According to the GRE database for 1993, graduates with majors in general psychology most frequently intend to study clinical psychology in graduate school. Distribution of the most common intended majors is as follow:

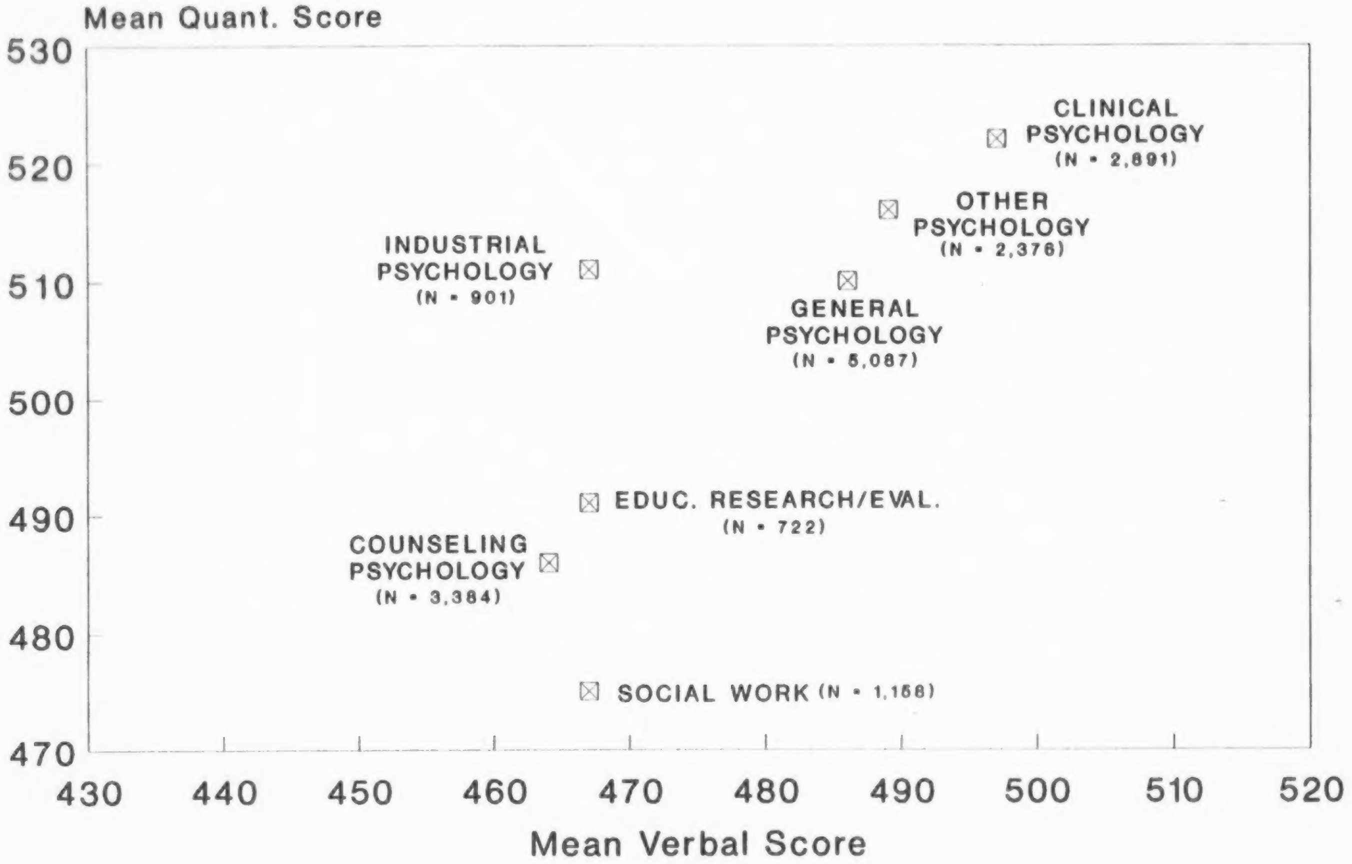
Intended Graduate Field	*Percent*
Clinical psychology	20.6
Counseling psychology	13.7
General psychology	11.7
Industrial/organizational psychology	3.6
Other psychology	9.6
Social work	4.7
Educational research and evaluation	2.9
Other fields or unspecified	33.2

Of the six most commonly selected fields, which attracts the highest scoring general psychology majors? Are psychology majors who are especially high or low in quantitative skills attracted to any particular areas?

Figure 24 shows five fields lying on a nearly straight line, indicating that the average verbal and quantitative skills represented by the examinees planning graduate study in these fields are highly correlated. If we regard the combination of verbal and quantitative skills as a broad indicator of academic ability or general academic preparation, examinees entering clinical psychology score the highest, those choosing other areas of psychology not listed explicitly score second highest. General psychology is third, educational research and evaluation is fourth, and counseling psychology is fifth. The other two graduate fields--industrial/organizational psychology and social work--lie off the diagonal line formed by the other five fields. Psychology majors planning graduate work in industrial/organizational psychology have a score pattern suggesting that, among general psychology majors, they are relatively higher in quantitative skills than in verbal skills. Similarly, those planning to enter social work have, among general psychology majors, relatively lower quantitative than verbal skills.

It is important, when making these interpretations of off-diagonal groups, to realize that to call an ability relatively high or low applies to the reference group on which the graph was generated. Social workers, for example, may have quantitative skills that are relatively high compared to some other reference group not included in the graph. It is also important to understand that the verbal and quantitative skill differences are relative to those of the other groups on the graph. For example,

Figure 24: Verbal and Quantitative Score Means of General Psychology Majors, Showing Intended Field of Graduate Study



Based on 1993 GRE data

examinees planning to enter industrial psychology have *relatively* high quantitative scores. This means that the difference between verbal and quantitative abilities is probably greater for examinees entering industrial psychology than for those entering clinical, general, counseling, or other areas on the diagonal line.

By using this graphic display, we can identify those fields that attract examinees having greater or lesser differences between their verbal and quantitative skills. We saw an instance of this earlier, in the analysis of examinees in engineering, whose quantitative abilities are especially high relative to their verbal abilities. Though we often tend to regard the choice of a major field as a function of the economy and other external factors, we know also that it depends to a great extent on student strengths and weaknesses. To the degree that students develop their academic skills--verbal and quantitative--equally, they will undoubtedly choose fields of study that are different from those chosen by students whose education has favored one skill or the other. This may be an area deserving further research.

Undergraduate Programs of Examinees Planning to Enter Veterinary Medicine. The scatterplot format just described can work equally well for displaying verbal and quantitative score patterns of people coming from various undergraduate majors and planning graduate work in a specified area. This example applies to veterinary medicine, a field in which applicants may have obtained their academic preparation in a variety of ways.

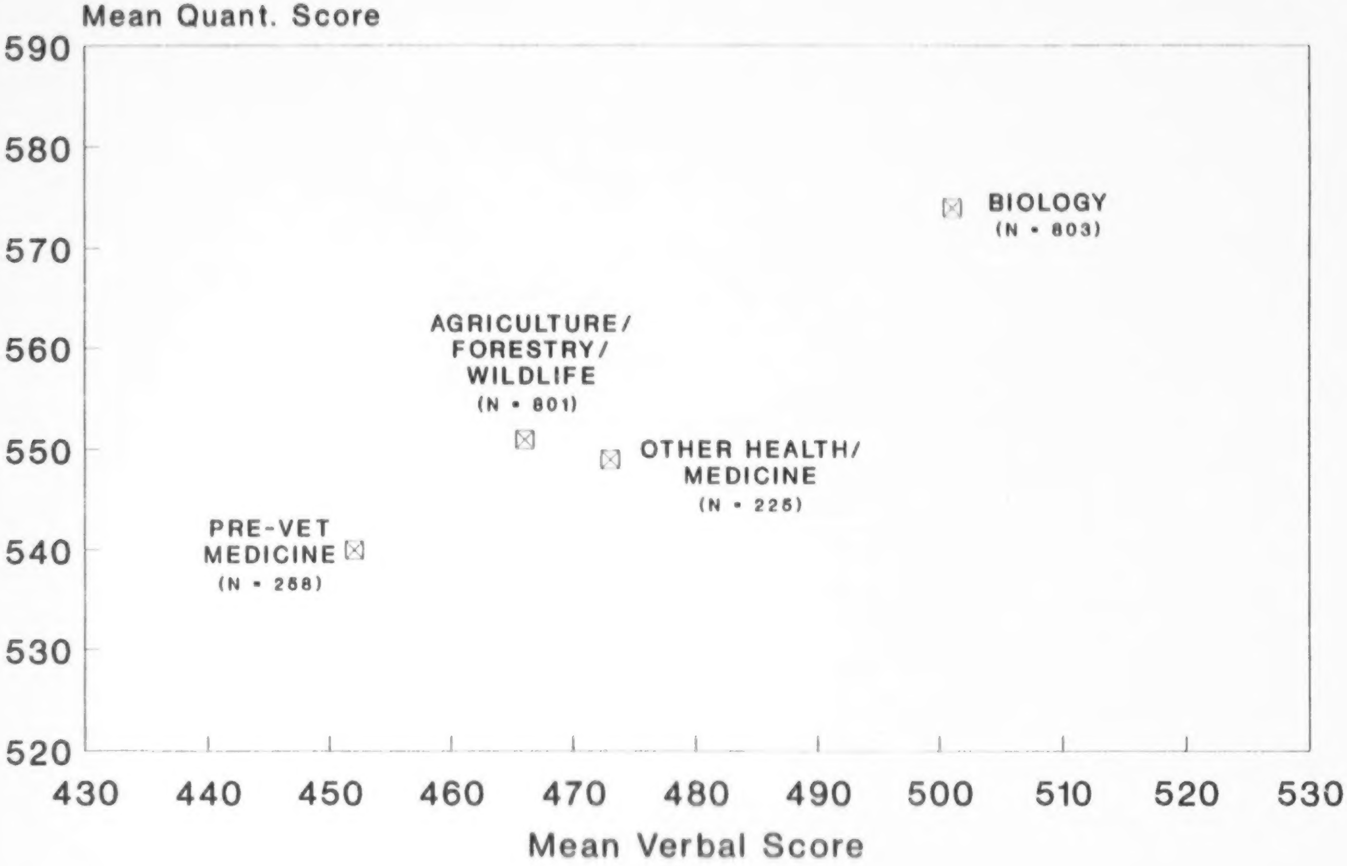
The most common undergraduate majors of examinees planning to enter veterinary medicine are biology and a category we call agriculture, forestry, and wildlife. Lesser numbers actually have pre-veterinary majors, and somewhat fewer are in the category we call other health and medical sciences, which, for our purposes here, generally means premedicine. Suppose, hypothetically, that admissions officers in veterinary schools wished to know, at the nationwide level, how the general academic skills of applicants from the pre-veterinary programs compared with the skills of applicants from the other three areas.

Figure 25 shows where the verbal and quantitative score averages lie for the four undergraduate fields in question. The lowest average scores, both verbal and quantitative, were earned by examinees with pre-veterinary majors. With these results in hand, the veterinary schools might want to investigate further to learn whether the colleges with pre-veterinary programs are less selective or whether they are failing to provide the basic academic education that the veterinary schools require for admission.

Gender Balance of Biology Majors Choosing Specified Graduate Fields of Study. Of the natural sciences, the area attracting the greatest number of females is biology. When biology majors select graduate fields of study, females do not select fields in the same proportion that men do. In 1993, for example, 86% of the biology majors choosing nursing were female. On the other hand, only 45% of the biology majors choosing agriculture, forestry, and wildlife were female. Figure 26 shows a scatterplot of number of females and number of males choosing each of the fields most commonly selected by biology majors.

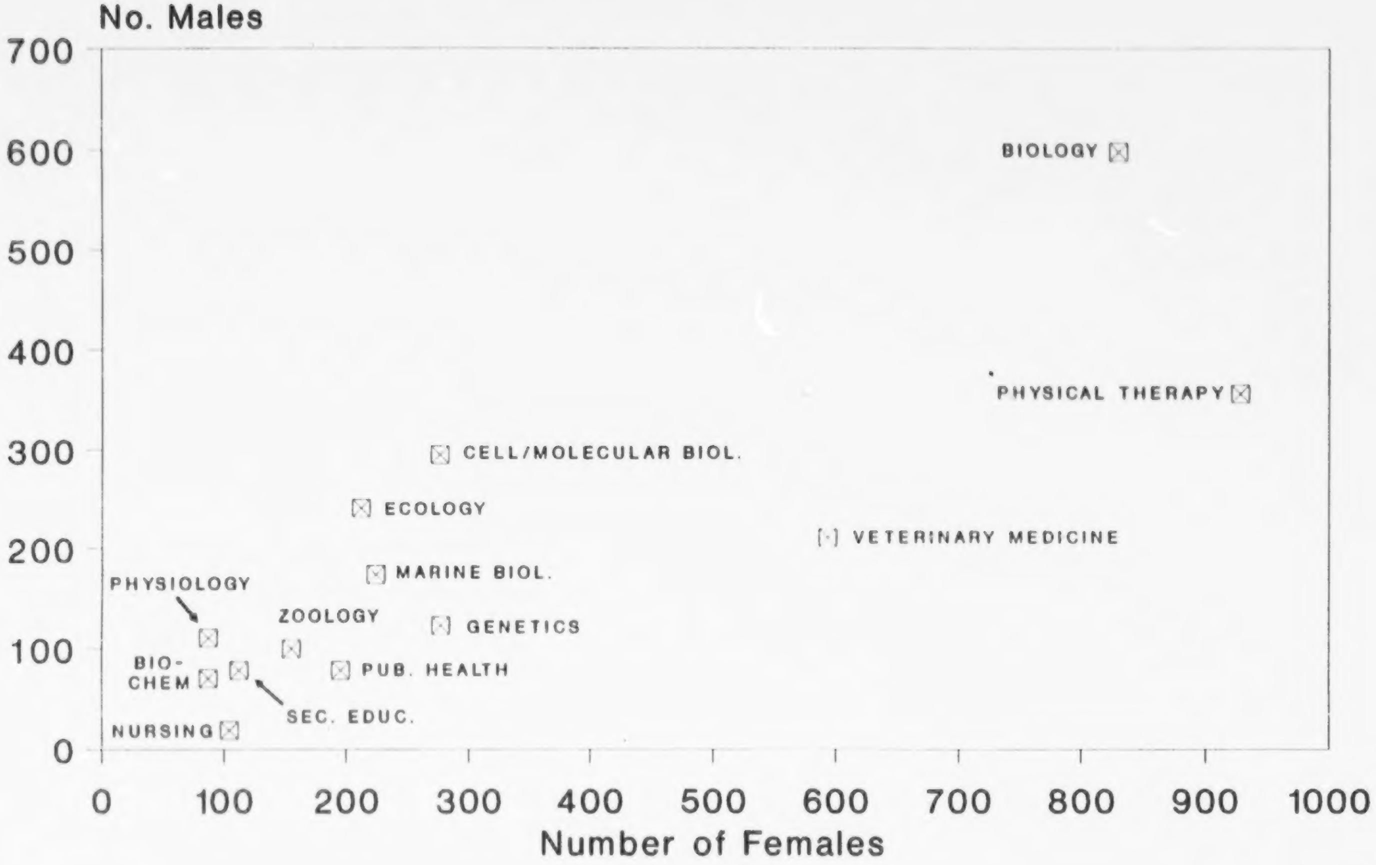
Biology itself is the most frequently chosen by both genders; physical therapy is most frequently chosen by females and is the second most frequently chosen field by males. We know from the GRE database that 61% of biology majors are female. The dotted diagonal line divides the graph in such a way that points lying below it represent graduate fields in which the female share is

Figure 25: Verbal and Quantitative Score Means of Examinees Planning to Study Veterinary Medicine, by Undergrad. Major



Based on 1993 GRE data

Figure 26: Gender Balance of Biology Majors Choosing Specified Graduate Fields of Study



disproportionately *high*; points above the line represent fields in which the female share is disproportionately *low*.

Those graduate fields in which the female share is about the same as it is in biology at the undergraduate level are biochemistry, zoology, and secondary education. Those fields that tend to favor males are physiology, marine biology, and general biology. More extremely, ecology and cell and molecular biology greatly favor males. Nursing, public health, genetics, veterinary medicine, and physical therapy attract disproportionately high numbers of females.

One advantage to using a scatterplot of this type over a table or graph of percentages is that it shows the actual number of each gender selecting a field in addition to providing a sense of how heavily each field is weighted by each gender. For example, 71% of the examinees attracted to public health are female and nearly the same percentage (72%) of examinees attracted to physical therapy are female, but the fact that the two points are so far apart on the graph indicates that the total number of examinees entering each of these fields is quite different. It is clear from the graph that two of the three fields attracting large numbers of examinees (veterinary medicine and physical therapy) have very large proportions of females.

Further Use of the Database

All disciplines want to attract the most able students. Obviously, all disciplines cannot. Consequently, many feel in competition for the brightest applicants. As the existence of this database becomes better known, it can provide valuable information for talent flow studies and can easily supply information for special requests. The great usefulness of this database lies in its ability to answer talent flow questions fairly easily for virtually any academic discipline.

This project was designed, however, not only to create a talent flow database and to present talent flow statistics from that file, but also to raise questions about talent flow, to design graphic methods to communicate talent flow information, and to suggest other ways to use the database.

Style of presentation is extremely important, enabling the reader to "see" talent flow. Conventional flow charts work very poorly for this purpose. Tables can present numbers and, in some instances, a simple pattern can be discerned. But multiple and related patterns only seem to emerge with graphic techniques that must be carefully devised to reveal those patterns. The scatterplot technique seems to work exceedingly well when comparing major fields not only on two variables, but on the relationship between those two variables.

We have seen that verbal and quantitative score averages are especially useful dimensions for scatterplots because people seem to choose their graduate school specialties based not on one of these abilities alone, but on the relationship between the two. We have also seen that plotting other dimensions, such as numbers of males and females, enables us to see not only the numbers in each field but the relative weighting of each gender entering the field.

The purpose of presenting scatterplots was not only to analyze the flow of examinees with particular majors, but to illustrate a technique for studying any set of interrelated variables, such as gender numbers and ratios, associated with field changes. By trying different variables on the axes, we learn more about the talent flow process. A study of underrepresented groups in some field might compare "percentage female" on one axis and "percentage minority" on the other. Or, a study of nontraditional students could graph number or percentage over age 30 on one axis and number or percent planning to study part-time on the other axis. Percentage planning to earn a doctorate versus undergraduate GPA, or percentage planning to earn a doctorate versus GRE scores would illustrate the relationships between achievement and aspiration for each field of study. The particular variables chosen for a given analysis will depend on the purpose of the analysis. An in-depth study of a particular discipline or a particular subgroup of examinees can be conducted in this manner, selecting numerous variables from the GRE background questionnaire, for one year or many.

The use of scatterplots in this manner illuminated an important finding from this study. The analyses show that there is considerable consistency over time in patterns of GRE verbal and quantitative scores, in the relationships of these scores to each other, and in the relationships of GRE scores to major field choices. These patterns, in other words, consistently relate GRE scores to major field choices. Examinees make major field choices based on their successes and failures in school and their knowledge of themselves. What this study suggests, therefore, is a new way of looking at GRE validity in terms of its ability to predict examinees' choices about their future.

In addition to exploring test validity questions using the database, there are numerous research questions that can be explored. Multivariate analyses may be conducted to estimate the interrelationships among selected variables. This database could support gender and minority studies, studies of students with disabilities, relationships between age and other variables, specific characteristics of students in a single academic area, comparisons of students of different socioeconomic levels, studies of international students, research on undergraduate course taking patterns and their relationships to test scores, grades, and aspirations. The uses of the database are limited only by the fact that the population is restricted to GRE test takers.

Creation of this special GRE database has made it possible for researchers and academic administrators to learn more about the flow of students between undergraduate and graduate school. We know that not all examinees apply and enroll in graduate school, and we know that some graduate school students never took the GRE. But even with those limitations, the GRE database contains a very large pool of potential graduate students, and talent-flow studies based on these data should prove valuable to educators and policy makers attempting to understand the choices graduate student applicants are making, the factors related to those choices, and the relationships between choices and outcomes.

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Appendix A

Major Field Code List for 1987

DEPARTMENT CODE LIST (for Item 13) AND MAJOR FIELD CODE LIST (for Item 16 I and K)

HUMANITIES
11 Archaeology
12 Architecture
26 Art History
13 Classical Languages
28 Comparative Literature
53 Dramatic Arts
14 English
29 Far Eastern Languages and Literature
15 Fine Arts, Art, Design
16 French
17 German
04 Linguistics
19 Music
57 Near Eastern Languages and Literature
20 Philosophy
21 Religious Studies or Religion
22 Russian/Slavic Studies
23 Spanish
24 Speech
10 Other Foreign Languages
98 Other Humanities

SOCIAL SCIENCES
27 American Studies
81 Anthropology
82 Business and Commerce
83 Communications
84 Economics
85 Education (including M.A. in Teaching)
01 Educational Administration
70 Geography
92 Government
99 Guidance and Counseling
86 History
87 Industrial Relations and Personnel
88 International Relations
18 Journalism
89 Law
90 Library Science
91 Physical Education
97 Planning (City, Community, Urban, Regional)
92 Political Science
93 Psychology, Clinical
09 Psychology, Educational
58 Psychology, Experimental/Developmental
08 Psychology, Other
79 Psychology, Social
94 Public Administration
95 Social Work
96 Sociology
80 Other Social Sciences

BIOLOGICAL SCIENCES
31 Agriculture
32 Anatomy
05 Audiology
33 Bacteriology
34 Biochemistry
35 Biology
45 Biomedical Sciences
36 Biophysics
37 Botany
38 Dentistry
39 Entomology
46 Environmental Science/Ecology
40 Forestry
06 Genetics
41 Home Economics
25 Hospital and Health Services Administration
42 Medicine
07 Microbiology
74 Molecular & Cellular Biology
43 Nursing
77 Nutrition
44 Occupational Therapy
56 Pathology
03 Pharmacology
47 Pharmacy
48 Physical Therapy
49 Physiology
50 Public Health
55 Speech-Language Pathology
51 Veterinary Medicine
52 Zoology
30 Other Biological Sciences

PHYSICAL SCIENCES
54 Applied Mathematics
51 Astronomy
62 Chemistry
78 Computer Sciences
63 Engineering, Aeronautical
64 Engineering, Chemical
65 Engineering, Civil
66 Engineering, Electrical
67 Engineering, Industrial
68 Engineering, Mechanical
69 Engineering, Other
71 Geology
72 Mathematics
73 Metallurgy
75 Oceanography
76 Physics
59 Statistics
60 Other Physical Sciences

02 **ANY DEPARTMENT NOT LISTED**

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Appendix B

Major Field Code List for 1989

DEPARTMENT CODE LIST (FOR ITEMS 11 AND 12) AND MAJOR FIELD CODE LIST (for Items 13-j and 13-l)

NATURAL SCIENCES

Agriculture
0101 Agricultural Economics
0102 Agricultural Production
0103 Agricultural Sciences
0104 Agronomy
0105 Animal Sciences
0106 Fishery Sciences
0107 Food Sciences
0108 Forestry and Related Sciences
0109 Horticulture
0110 Resource Management
0111 Parks and Recreation Management
0112 Plant Sciences (Except Agronomy, see 0104)
0113 Renewable Natural Resources
0114 Soil Sciences
0115 Wildlife Management
0199 Agriculture—Other

Biological Sciences
0201 Anatomy
0221 Bacteriology
0202 Biochemistry
0203 Biology
0204 Biometry
0222 Biophysics
0205 Botany
0206 Cell and Molecular Biology
0207 Ecology
0208 Embryology
0209 Entomology and Parasitology
0210 Genetics
0211 Marine Biology
0212 Microbiology
0213 Neurosciences
0214 Nutrition
0215 Pathology
0216 Pharmacology
0217 Physiology
0218 Radiobiology
0219 Toxicology
0220 Zoology
0299 Biological Sciences — Other

Chemistry
0301 Chemistry, General
0302 Analytical Chemistry
0303 Inorganic Chemistry
0304 Organic Chemistry
0305 Pharmaceutical Chemistry
0306 Physical Chemistry
0399 Chemistry—Other

Computer and Information Sciences
0401 Computer Programming
0402 Computer Sciences
0403 Data Processing
0404 Information Sciences
0405 Microcomputer Applications
0406 Systems Analysis
0499 Computer Sciences—Other

Earth, Atmospheric, and Marine Sciences
0501 Atmospheric Sciences
0502 Environmental Sciences
0503 Geochemistry
0504 Geology
0505 Geophysics and Seismology
0506 Paleontology
0507 Meteorology
0508 Oceanography
0599 Earth, Atmospheric, and Marine Sciences—Other

Health and Medical Sciences
0601 Allied Health
0602 Audiology
0603 Chiropractic
0604 Dental Sciences
0605 Environmental Health
0606 Epidemiology
0607 Health Science Administration
0608 Immunology
0609 Medical Sciences
0610 Nursing
0618 Occupational Therapy
0611 Optometry
0612 Osteopathic Medicine
0613 Pharmaceutical Sciences
0619 Physical Therapy
0614 Podiatry
0615 Pre-Medicine
0616 Public Health
0620 Speech-Language Pathology
0617 Veterinary Medicine
0699 Health and Medical Sciences—Other

Mathematical Sciences
0701 Actuarial Sciences
0702 Applied Mathematics
0703 Mathematics
0704 Probability & Statistics
0799 Mathematical Sciences—Other

Physics and Astronomy
0801 Astronomy
0802 Astrophysics
0803 Atomic/Molecular Physics
0804 Nuclear Physics
0805 Optics
0808 Physics
0806 Planetary Science
0807 Solid State Physics
0899 Physics and Astronomy—Other

Natural Sciences—Other
0999 Natural Sciences—Other

ENGINEERING

Engineering—Chemical
1001 Chemical Engineering
1002 Pulp and Paper Production
1003 Wood Science
1099 Chemical Engineering—Other

Engineering—Civil
1101 Architectural Engineering
1102 Civil Engineering
1103 Environmental/Sanitary Engineering
1199 Civil Engineering—Other

Engineering—Electrical and Electronics
1201 Computer Engineering
1202 Communications Engineering
1203 Electrical Engineering
1204 Electronics Engineering
1299 Electrical & Electronics Engineering—Other

Engineering—Industrial
1301 Industrial Engineering
1302 Operations Research
1399 Industrial Engineering—Other

Engineering—Materials
1401 Ceramic Engineering
1402 Materials Engineering
1403 Materials Science
1404 Metallurgical Engineering
1499 Materials Engineering—Other

Engineering—Mechanical
1501 Engineering Mechanics
1502 Mechanical Engineering
1599 Mechanical Engineering—Other

Engineering—Other
1601 Aerospace Engineering
1602 Agricultural Engineering
1603 Biomedical Engineering
1604 Engineering Physics
1605 Engineering Science
1606 Geological Engineering
1607 Mining Engineering
1608 Naval Architecture and Marine Engineering
1609 Nuclear Engineering
1610 Ocean Engineering
1611 Petroleum Engineering
1612 Systems Engineering
1613 Textile Engineering
1699 Engineering—Other

SOCIAL SCIENCES

Anthropology & Archaeology
1701 Anthropology
1702 Archaeology

Economics
1801 Economics
1802 Econometrics

Political Science
1901 International Relations
1902 Political Science and Government
1903 Public Policy Studies
1999 Political Science—Other

Psychology
2001 Clinical Psychology
2002 Cognitive Psychology
2003 Community Psychology
2004 Comparative Psychology
2005 Counseling Psychology
2006 Developmental Psychology
2007 Experimental Psychology
2008 Industrial and Organizational Psychology
2009 Personality Psychology
2010 Physiological Psychology
2011 Psycholinguistics
2012 Psychometrics
2013 Psychopharmacology
2014 Quantitative Psychology
2015 Social Psychology
2099 Psychology—Other

Sociology
2101 Demography
2102 Sociology

Social Sciences—Other
2206 American Studies
2201 Area Studies
2202 Criminal Justice/Criminology
2203 Geography
2204 Public Affairs
2205 Urban Studies
2299 Social Sciences—Other

HUMANITIES AND ARTS

Arts—History, Theory, and Criticism
2301 Art History and Criticism
2302 Music History, Musicology and Theory
2399 Arts—History, Theory, and Criticism—Other

Arts—Performance and Studio
2401 Art
2402 Dance
2403 Drama/Theatre Arts
2404 Music
2405 Design
2406 Fine Arts
2499 Arts—Performance and Studio—Other

English Language and Literature
2501 English Language and Literature
2502 American Language and Literature
2503 Creative Writing
2599 English Language and Literature—Other

Foreign Languages and Literatures
2601 Asian Languages
2609 Classical Languages
2602 Foreign Literature
2603 French
2604 Germanic Languages
2605 Italian
2606 Russian
2607 Semitic Languages
2608 Spanish
2699 Foreign Languages—Other

History
2701 American History
2702 European History
2703 History of Science
2799 History—Other

Philosophy
2801 All Philosophy Fields

Humanities and Arts—Other
2901 Classics
2902 Comparative Language and Literature
2903 Linguistics
2904 Religious Studies
2999 Humanities and Arts—Other

EDUCATION

Education—Administration
3001 Educational Administration
3002 Educational Supervision

Education—Curriculum and Instruction
3101 Curriculum and Instruction

Education—Early Childhood
3201 Early Childhood Education

Education—Elementary
3301 Elementary Education
3302 Elementary-level Teaching Fields

Education—Evaluation and Research
3401 Educational Statistics and Research
3402 Educational Testing, Evaluation, and Measurement
3403 Educational Psychology
3404 Elementary and Secondary Research
3405 Higher Education Research
3406 School Psychology

Education—Higher
3501 Educational Policy
3502 Higher Education

Education—Secondary
3601 Secondary Education
3602 Secondary Level Teaching Fields

Education—Special
3701 Education of Gifted Students
3702 Education of Handicapped Students
3703 Education of Students with Specific Learning Disabilities
3704 Remedial Education
3799 Special Education — Other

Education—Student Counseling and Personnel Services
3801 Personnel Services
3802 Student Counseling

Education—Other
3901 Adult and Continuing Education
3908 Agricultural Education
3902 Bilingual/Crosscultural Education
3903 Educational Media
3904 Junior High/Middle School Education
3909 Physical Education
3905 Pre-Elementary Education
3906 Social Foundations
3907 Teaching English as a Second Language/Foreign Language
3999 Education — Other

BUSINESS

Accounting
4001 Accounting
4002 Taxation

Banking and Finance
4101 Commercial Banking
4102 Finance
4103 Investments and Securities

Business Administration and Management
4201 Business Administration and Management
4202 Human Resource Development
4203 Institutional Management
4204 Labor/Industrial Relations
4205 Management Science
4206 Organizational Behavior
4207 Personnel Management
4299 Business Management—Other

Business—Other
4301 Business Economics
4302 International Business Management
4303 Management Information Systems
4304 Marketing and Distribution
4305 Marketing Management and Research
4399 Business — Other

OTHER FIELDS

Architecture and Environmental Design
4401 Architecture
4402 City and Regional Planning
4403 Environmental Design
4404 Interior Design
4405 Landscape Architecture
4406 Urban Design
4499 Architecture and Environmental Design—Other

Communications
4501 Advertising
4502 Communications Research
4503 Journalism and Mass Communications
4504 Public Relations
4505 Radio, TV, and Film
4508 Speech Communication
4599 Communications—Other

Home Economics
4601 Consumer Economics
4603 Family Counseling
4602 Family Relations
4699 Home Economics—Other

Library and Archival Sciences
4701 Library Science
4702 Archival Science

Public Administration
4801 Public Administration

Religion and Theology
4901 Religion
4902 Theology

Social Work
5001 Social Work

Other Fields
5101 Interdisciplinary Programs
5102 Law
5199 Any Department Not Listed

NOTE: IF UNDECIDED USE [illegible].

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Appendix C

Major Field Category Transformations
1978-1987

New Detailed Major Field Category Transformations
For GRE Background Questionnaire 1978-1987

New Code	Codes Used in GRE Registration Bulletins, by Year 1978	1980	1981	1982	1983	1984	1985	1986	1987	New Major Field Name
1	54,59,72	54,59,72	54,59,72	54,59,72	54,59,72	54,59,72	54,59,72	54,59,72	54,59,72	Mathematics & Statistics
2	61,76	61,76	61,76	61,76	61,76	61,76	61,76	61,76	61,76	Physics & Astronomy
3	62	62	62	62	62	62	62	62	62	Chemistry
4	78	78	78	78	78	78	78	78	78	Computer Science
5				New category added after 1987						Other Computer & Information Sciences
6	35	35	35	35	35	35	35	35	35	Biology
7					74	74	74	74	74	Cell & Molecular Biology
8	06	06	06	06	06	06	06	06	06	Genetics
9	34	34	34	34	34	34	34	34	34	Biochemistry
10	49	49	49	49	49	49	49	49	49	Physiology
11	52	52	52	52	52	52	52	52	52	Zoology
12				New category added after 1987						Ecology
13				New category added after 1987						Marine Biology
14	77	77	77	77	77	77	77	77	77	Nutrition
15	07,08,30	07,08,30	07,08,30	07,08,30	07,08,30	07,30	07,30	07,30	07,30	Other Biological Sciences
	32,33,36	32,33,36	32,33,36	32,33,36	32,33,36	32,33,36	32,33,36	32,33,36	32,33,36	"
	37,39,56	37,39,56	37,39,56	37,39,56	37,39,56	37,39,56	37,39,56	37,39,56	37,39,56	"
16	31,40	31,40	31,40	31,40	31,40	31,40	31,40	31,40	31,40	Agriculture, Forestry, Wildlife
17	71	71	71	71	71	71	71	71	71	Geology, Geochemistry, Geophysics, & Paleontology
18	75	75	75	75	46,75	46,75	46,75	46,75	46,75	Other Earth, Atmospheric, Marine, & Environ. Sciences
19	60	60	60	60	60	60	60	60	60	Other Natural Sciences
20	43	43	43	43	43	43	43	43	43	Nursing
21	50	50	50	50	50	50	50	50	50	Public Health
22	51	51	51	51	51	51	51	51	51	Veterinary Medicine
23	48	48	48	48	48	48	48	48	48	Physical Therapy
24	05,24	05,24	05,24	05,24	05,24,55	05,24,55	05,24,55	05,24,55	05,24,55	Speech, Hearing, & Language Pathology
25	03,25,38	03,25,38	03,25,38	03,25,38	03,25,38	03,25,38	03,25,38	03,25,38	03,25,38	Other Health & Medical Sciences
	42,44,45	42,44,45	42,44,45	42,44,45	42,44,45	42,44,45	42,44,45	42,44,45	42,44,45	"
	46,47	46,47	46,47	46,47	47	47	47	47	47	"
26	63	63	63	63	63	63	63	63	63	Aerospace Engineering
27				New category added after 1987						Biomedical Engineering
28	64	64	64	64	64	64	64	64	64	Chemical Engineering
29	65	65	65	65	65	65	65	65	65	Civil Engineering
30	66	66	66	66	66	66	66	66	66	Electrical & Electronics Engineering
31	67	67	67	67	67	67	67	67	67	Industrial Engineering
32	73	73	73	73	73	73	73	73	73	Materials Engineering
33	68	68	68	68	68	68	68	68	68	Mechanical Engineering
34	69,74	69,74	69,74	69,74	69	69	69	69	69	Other Engineering
35	11,81	11,81	11,81	11,81	11,81	11,81	11,81	11,81	11,81	Anthropology & Archaeology

New Code	Codes Used in GRE Registration Bulletins, by Year 1978	1980	1981	1982	1983	1984	1985	1986	1987	New Major Field Name
36	84	84	84	84	84	84	84	84	84	Economics
37	88	88	88	88	88	88	88	88	88	International Relations
38	New category added after 1987									Public Policy Studies
39	92	92	92	92	92	92	92	92	92	Other Political Science & Government
40	93	93	93	93						General Psychology
41					93	93	93	93	93	Clinical Psychology
42	99	99	99	99	99	99	99	99	99	Counseling Psychology
43	87	87	87	87	87	87	87	87	87	Industrial & Organizational Psychology
44	79	79	79	79	58,79	08,58,79	08,58,79	08,58,79	08,58,79	Other Psychology
45	96	96	96	96	96	96	96	96	96	Sociology
46	70	70	70	70	70	70	70	70	70	Geography
47	New category added after 1987									Criminal Justice & Criminology
48	27,80,97	27,80,97	27,80,97	27,80,97	27,80,97	27,80,97	27,80,97	27,80,97	27,80,97	Other Social Sciences
49	53	53	53	53	53	53	53	53	53	Drama & Theatre Arts
50	19	19	19	19	19	19	19	19	19	Music
51	15	15	15	15	15	15	15	15	15	Fine Arts
52	New category added after 1987									Other Performance & Studio Arts
53	26	26	26	26	26	26	26	26	26	Art History, Theory, & Criticism
54	New category added after 1987. See note 1									American Language & Literature
55	New category added after 1987. See note 1									English Language & Literature
56	New category added after 1987. See note 1									Creative Writing
57	16	16	16	16	16	16	16	16	16	French
58	23	23	23	23	23	23	23	23	23	Spanish
59	10,13,17	10,13,17	10,13,17	10,13,17	10,13,17	10,13,17	10,13,17	10,13,17	10,13,17	Other Foreign Languages & Literature
	22,29	22,29	22,29	22,29	22,29	22,29	22,29	22,29	22,29	"
	55,57,58	55,57,58	55,57,58	55,57,58	57	57	57	57	57	"
60	New category added after 1987. See note 2									American History
61	New category added after 1987. See note 2									European History
62	New category added after 1987. See note 2									Other History
63	20	20	20	20	20	20	20	20	20	Philosophy
64	04,21,28	04,21,28	04,21,28	04,21,28	04,21,28	04,21,28	04,21,28	04,21,28	04,21,28	Other Humanities and Arts
	98	98	98	98	98	98	98	98	98	"
65	01	01	01	01	01	01	01	01	01	Education Administration
66	New category added after 1987. See note 3.									Curriculum & Instruction
67	New category added after 1987. See note 3.									Elementary Education
68	New category added after 1987. See note 3.									Secondary Education
69	New category added after 1987. See note 3.									Special Education
70	91	91	91	91	91	91	91	91	91	Physical Education
71	09	09	09	09	09	09	09	09	09	Education Research & Evaluation
72	New category added after 1987. See note 3.									Other Education
73	New category added after 1987. See note 4.									Business Administration and Management
74	New category added after 1987. See note 4.									Accounting, Finance, & Other Business
75	12	12	12	12	12	12	12	12	12	Architecture

New	Codes Used in GRE Registration Bulletins, by Year									
Code	**1978**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**New Major Field Name**
76	New category added after 1987									Other Architecture & Environmental Design
77	18	18	18	18	18	18	18	18	18	Journalism & Mass Communications
78	New category added after 1987. See note 5.									Radio, TV, Film
79	New category added after 1987. See note 5.									Other Communications
80	41	41	41	41	41	41	41	41	41	Home Economics
81	90	90	90	90	90	90	90	90	90	Library and Archival Science
82	94	94	94	94	94	94	94	94	94	Public Administration
83	New category added after 1987									Religion and Theology
84	New category added after 1987									Ordained Ministry & Rabbinate
85	95	95	95	95	95	95	95	95	95	Social Work
86	02,89	02,89	02,89	02,89	02,89	02,89	02,89	02,89	02,89	Other & Interdisciplinary
87										Missing

NOTES

Note 1: New codes 54, 55, and 56 combined are equivalent to old code 14 ("English") for 1978 through 1987.

Note 2: New codes 60, 61, and 62 combined are equivalent to old code 86 ("History") for 1978 through 1987.

Note 3: New codes 66, 67, 68, 69, 70, and 72 combined should be roughly equivalent to old code 85 ("Education") for 1978 through 1987.

Note 4: New codes 73 and 74 combined are equivalent to old code 82 ("Business and Commerce") for 1978 through 1987.

Note 5: New codes 78 and 79 combined are equivalent to old code 83 ("Communications") which excluded journalism for 1978 through 1987.

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Appendix D

Major Field Category Transformations
1988-1993

New Detailed Major Field Category Transformations for GRE Background Questionnaire 1988-1993

New Code	GRE Code	New Major Field Name
1	0700-0799	Mathematics & Statistics
2	0800-0899	Physics & Astronomy
3	0300-0399	Chemistry
4	0402	Computer Science
5	0400-0401	Other Computer & Information Sciences
	0403-0499	"
6	0203	Biology
7	0206	Cell & Molecular Biology
8	0210	Genetics
9	0202	Biochemistry
10	0217	Physiology
11	0220	Zoology
12	0207	Ecology
13	0211	Marine Biology
14	0214	Nutrition
15	0200-0201	Other Biological Sciences
	0204-0205	"
	0208-0209	"
	0212-0213	"
	0215-0216	"
	0218-0219	"
	0221-0299	"
16	0100-0199	Agriculture, Forestry, & Wildlife
17	0503-0506	Geology, Geochemistry, Geophysics, & Paleontology
18	0500-0502	Other Earth, Atmospheric, Marine, & Environmental Sciences
	0507-0599	"
19	0900-0999	Other Natural Sciences
20	0610	Nursing
21	0616	Public Health
22	0617	Veterinary Medicine
23	0619	Physical Therapy
24	0602	Speech, Hearing & Language Pathology
	0620	"
25	0600-0601	Other Health & Medical Sciences
	0603-0609	"
	0611-0615	"
	0618	"
	0621-0699	"
26	1601	Aerospace Engineering
27	1603	Biomedical Engineering
28	1000-1099	Chemical Engineering
29	1100-1199	Civil Engineering
30	1200-1299	Electrical & Electronics Engineering
31	1300-1399	Industrial Engineering
32	1400-1499	Materials Engineering
33	1500-1599	Mechanical Engineering

New Code	GRE Code	New Major Field Name
34	1600	Other Engineering
	1602	"
	1604-1699	"
35	1700-1799	Anthropology & Archaeology
36	1800-1899	Economics
37	1901	International Relations
38	1903	Public Policy Studies
39	1900	Other Political Science & Government
	1902	"
	1904-1999	"
40	2000	General Psychology
	2016	"
41	2001	Clinical Psychology
42	2005	Counseling Psychology
43	2008	Industrial & Organizational Psychology
44	2002-2004	Other Psychology
	2006-2007	"
	2009-2011	"
	2012-2099	"
45	2100-2199	Sociology
46	2203	Geography
47	2202	Criminal Justice & Criminology
48	2200-2201	Other Social Sciences
	2204-2299	"
49	2403	Drama & Theatre Arts
50	2302	Music
	2304	"
51	2406	Fine Arts
52	2400-2402	Other Performance & Studio Arts
	2405	"
	2407-2499	"
53	2300-2301	Art History, Theory, & Criticism
	2303-2399	"
54	2502	American Language & Literature
55	2500-2501	English Language & Literature
	2504-2599	"
56	2503	Creative Writing
57	2603	French
58	2608	Spanish
59	2600-2602	Other Foreign Languages & Literature
	2604-2607	"
	2609-2699	"
60	2701	American History
61	2702	European History
62	2700	Other History
	2703-2799	"
63	2800-2899	Philosophy
64	2900-2999	Other Humanities and Arts
65	3000-3099	Administrative Education
66	3100-3199	Curriculum & Instructional Education
67	3300-3399	Elementary Education

New Code	GRE Code	New Major Field Name
68	3600-3699	Secondary Education
69	3700-3799	Special Education
70	3909	Physical Education
71	3400-3499	Education Research & Evaluation
72	3200-3299	Other Education
	3500-3599	"
	3800-3899	"
	3900-3908	"
	3910-3999	"
73	4200-4299	Business Administration and Management
74	4000-4199	Accounting, Finance, & Other Business
	4300-4399	"
75	4401	Architecture
76	4400	Other Architecture & Environmental Design
	4402-4499	"
77	4503	Journalism & Mass Communications
78	4505	Radio, TV, Film
79	4500-4502	Other Communications
	4504	"
	4506-4599	"
80	4600-4699	Home Economics
81	4700-4799	Library and Archival Science
82	4800-4899	Public Administration
83	4900-4902	Religion and Theology
84	4903	Ordained Ministry & Rabbinate
85	5000-5099	Social Work
86	5100-5199	Other & Interdisciplinary
87		Missing

Appendix E

Broad Major Field Definitions

BROAD MAJOR FIELD DEFINITIONS

01 Arts and Humanities

49 Drama/Theatre Arts
50 Music
51 Fine Arts
52 Other Performance/Studio Arts
53 Art History and Theory
54 American Language and Literature
55 English Language and Literature
56 Creative Writing
57 French
58 Spanish
59 Other Foreign Language/Literature
60 American History
61 European History
62 Other History
63 Philosophy
64 Other Arts and Humanities

02 Mathematics, Physical and Computer Sciences

01 Mathematics/Statistics
02 Physics/Astronomy
03 Chemistry
04 Computer Science
05 Other Computer/Information Sciences
17 Geology/Geochemistry/Geophysics/Paleontology

03 Engineering

26 Aerospace Engineering
27 Biomedical Engineering
28 Chemical Engineering
29 Civil Engineering
30 Electrical Engineering
31 Industrial Engineering
32 Materials Engineering
33 Mechanical Engineering
34 Other Engineering

04 Biological Sciences

06 Biology
07 Cellular/Molecular Biology
08 Genetics
09 Biochemistry
10 Physiology
11 Zoology
12 Ecology
13 Marine Biology
14 Nutrition
15 Other Biological Sciences
16 Agriculture/Forestry/Wildlife
18 Earth/Atmospheric/Marine/Environmental Sciences

05 Social Sciences

35 Anthropology/Archaeology
36 Economics
37 International Relations
38 Public Policy Studies
39 Other Political/Government Sciences
40 General Psychology
41 Clinical Psychology
42 Counseling Psychology
43 Industrial/Organizational Psychology
44 Other Psychology
45 Sociology
46 Geography
47 Criminal Justice/Criminology
48 Other Social Sciences

06 Health Sciences and Services

20 Nursing
21 Public Health
22 Veterinary Medicine
23 Physical Therapy
24 Speech/Hearing/Language Pathology
25 Other Health and Medical Sciences

07 Education

65 Administrative Education
66 Curriculum/Instructional Education
67 Elementary Education
68 Secondary Education
69 Special Education
70 Physical Education
71 Education Research and Evaluation
72 Other Education

08 Business

73 Business Administration/Management
74 Accounting/Finance/Other Business

09 All Other Fields

19 Other Natural Sciences
75 Architecture
76 Other Architecture/Environmental Design
77 Journalism/Mass Communications
78 Radio/TV/Film
79 Other Communications
80 Home Economics
81 Library and Archival Sciences
82 Public Administration
83 Religion and Theology
84 Ordained Ministry and Rabbinate
85 Social Work
86 Other and Interdisciplinary

10 Missing

87 Missing

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Appendix F

Dataset Layout

DATA SET RECORD LAYOUT

LAYOUT GRE DATA BASE 1982-1993	PROJECT/JOB	DATA ANALYST NANCY ROBERTSON	PAGE 1 of 4
DATA SET NAME NJT6600.GREDBASE.MAJOR__ (WHERE __ IS YEAR)		PROJECT DIRECTOR JERILEE GRANDY	DATE 01/18/93

RETENTION PERIOD

RECORD LENGTH
259

BLOCKSIZE
27972

NON-TECHNICAL DESCRIPTION

REDUCED-RECORD GRE RESEARCH FILES FOR 1982 TO 1993 WITH DUPLICATE ADMINS ELIMINATED AND RECODED UGRAD. AND GRAD. MAJORS AND MAJOR GROUPS APPENDED. DATA FOR 1982 TO 1989 RESIDE ON K15964. DATA FOR 1990 TO 1993 RESIDE ON K21984.

(The first 1,000 records for 1982 and 1988 are available for viewing in disk data sets NJT6600.GREDBASE.MAJOR82 and NJT6600.GREDBASE.MAJOR88.)

START	END	SIZE	DATA FMT.	FIELD NAME	RANGE VALUES	DESCRIPTION
1	2	2		GRE year	82-93	
3	14	12		Composite i.d. for sorting and matching		Not available
15	29	15		Last name		Not available
30	39	10		First name		Not available
40	40	1		Middle initial		Not available
41	41	1		Sex	1,2 or 'M','F'	
42	47	6		Birth date		MMDDYY
48	56	9		Social Security number		Not available
57	57	1		Ed. level at registration time (only for 1982-1987)	0-8	
58	60	3		Country code		
61	61	1		MGSLS question	1-7	
62	65	4		Attending Institution (AI) code		Not available
66	109	44		Up to 4 DI's and departments to which scores were sent		4-digit inst. code, 2 digit old dept code, 4-digit new dept. code, and a report code (0=no scores, 1=all scores, 2=general test, 3=subject test) for zero to four DI's.
110	110	1		Have you taken GRE previously?	1-3	1=No. 2 & 3=Yes. Only valid pre-1988.
111	111	1		Blank		
112	112	1		Size of ugrad. inst.	1-5	Pre-1988
113	113	1		Ugrad. school description	1-3	Pre-1988
114	115	2		Ugrad. major field	0-99	Pre-1988
116	117	2		Grad. major field	0-99	Pre-1988
118	118	1		Grad. inst. description	1-4	Pre-1988

DATA SET RECORD LAYOUT

LAYOUT	PROJECT/JOB	DATA ANALYST	PAGE
GRE DATA BASE 1982-1993		NANCY ROBERTSON	2 of 4

DATA SET NAME	PROJECT DIRECTOR	DATE
NJT6600.GREDBASE.MAJOR__ (WHERE __ IS YEAR)	JERILEE GRANDY	01/18/93

RETENTION PERIOD

RECORD LENGTH
259

BLOCKSIZE
27972

NON-TECHNICAL DESCRIPTION

REDUCED-RECORD GRE RESEARCH FILES FOR 1982 TO 1993 WITH DUPLICATE ADMINS ELIMINATED AND RECODED UGRAD. AND GRAD. MAJORS AND MAJOR GROUPS APPENDED. DATA FOR 1982 TO 1989 RESIDE ON K15964. DATA FOR 1990 TO 1993 RESIDE ON K21984.

(The first 1,000 records for 1982 and 1988 are available for viewing in disk data sets NJT6600.GREDBASE.MAJOR82 and NJT6600.GREDBASE.MAJOR88.)

START	END	SIZE	DATA FMT.	FIELD NAME	RANGE VALUES	DESCRIPTION
119	120	2		Year last attended grad. school		Pre-1988
121	121	1		Father's ed. level	1-6	Pre-1988
122	122	1		Mother's ed. level	1-6	Pre-1988
123	123	1		Average family income	1-4	Pre-1988
124	124	1		High school location	1-4	Pre-1988
125	125	1		U.S. citizenship status	1-3	Valid for all years: 1=U.S., 2=Resident Alien, 3=Neither
126	128	3		Country of citizenship		Valid for all years
129	130	2		State or province		Valid for all years
131	131	1		Ethnicity	1-8	Valid for all years
132	132	1		Disability	1-7	Valid for all years
133	139	7		Reasons for taking General Test	blank or 'Y'	Each of the following background questions is valid only for year 1988 and following
140	146	7		Reasons for taking Subject Test	blank or 'Y'	1988-1993
147	147	1		Attending grad. school full or part time	1-3	1988-1993
148	148	1		Ed. level	1-7	1988-1993
149	150	2		Year of bachelor's degree		1988-1993
151	154	4		Ugrad. major field		1988-1993
155	155	1		Grad. degree objective	1-6	1988-1993
156	159	4		Grad. major field		1988-1993
160	160	1		Overall UGPA	1-7	1988-1993
161	188	28		No. of ugrad. courses in 28 fields	A-E	1988-1993
189	189	1		Communicates best in English	'Y' or 'N'	1988-1993

DATA SET RECORD LAYOUT

LAYOUT GRE DATA BASE 1982-1993	PROJECT-JOB	DATA ANALYST NANCY ROBERTSON	PAGE 3 of 4
DATA SET NAME NJT6600.GREDBASE.MAJOR__ (WHERE __ IS YEAR)		PROJECT DIRECTOR JERILEE GRANDY	DATE 01/18/93

RETENTION PERIOD

RECORD LENGTH
259

BLOCKSIZE
27972

NON-TECHNICAL DESCRIPTION
REDUCED-RECORD GRE RESEARCH FILES FOR 1982 TO 1993 WITH DUPLICATE ADMINS ELIMINATED AND RECODED UGRAD. AND GRAD. MAJORS AND MAJOR GROUPS APPENDED. DATA FOR 1982 TO 1989 RESIDE ON K15964. DATA FOR 1990 TO 1993 RESIDE ON K21984.

(The first 1,000 records for 1982 and 1988 are available for viewing in disk data sets NJT6600.GREDBASE.MAJOR82 and NJT6600.GREDBASE.MAJOR88.)

START	END	SIZE	DATA FMT.	FIELD NAME	RANGE VALUES	DESCRIPTION
190	190	1		English the dominant language in household	'Y' or 'N'	1988-1993
191	193	3		Native language code		1988-1993
194	194	1		Father's ed. level	1-9	1988-1993
195	195	1		Mother's ed. level	1-9	1988-1993
196	196	1		Published book or article	'Y' or 'N'	1988-1993
197	197	1		Elected to honor society	'Y' or 'N'	1988-1993
198	198	1		Applied for financial aid	1-3	1988-1993
199	199	1		Enrollment dependent on financial aid	1-3	1988-1993
200	208	9		Preparation for General Test	Blank or 'Y'	1988-1993
209	217	9		Preparation for Subject Test	Blank of 'Y'	1988-1993
218	218	1		Preferred region of grad. school	1-7	1988-1993
219	219	1		Ugrad. major GPA so far	1-7	1988-1993
220	220	1		Last 2 years GPA	1-7	1988-1993
221	221	1		Paid work hours per week	1-5	1988-1993
222	222	1		Community service hours per week	1-5	1988-1993
223	223	1		Most important honors	1-8	1988-1993
224	226	3		Self-reported TOEFL score		1988-1993
227	227	1		Applied for national fellowship	'Y' or 'N'	1989-1993
228	228	1		Fulltime work exp. or military service	1-7	1988-1993
229	232	4		Admin. year and month	YYMM	all years

DATA SET RECORD LAYOUT

LAYOUT GRE DATA BASE 1982-1993	PROJECT/JOB	DATA ANALYST NANCY ROBERTSON	PAGE 4 of 4
DATA SET NAME NJT6600.GREDBASE.MAJOR__ (WHERE __ IS YEAR)		PROJECT DIRECTOR JERILEE GRANDY	DATE 01/18/93

RETENTION PERIOD	NON-TECHNICAL DESCRIPTION REDUCED-RECORD GRE RESEARCH FILES FOR 1982 TO 1993 WITH DUPLICATE ADMINS. ELIMINATED AND RECODED UGRAD. AND GRAD. MAJORS AND MAJOR GROUPS APPENDED. DATA FOR 1982 TO 1989 RESIDE ON K15964. DATA FOR 1990 TO 1993 RESIDE ON K21984. (The first 1,000 records for 1982 and 1988 are available for viewing in disk data sets NJT6600.GREDBASE.MAJOR82 and NJT6600.GREDBASE.MAJOR88.)
RECORD LENGTH 259	
BLOCKSIZE 27972	

START	END	SIZE	DATA FMT.	FIELD NAME	RANGE VALUES	DESCRIPTION
233	236	4		GRE verbal score	0200-0800	all years
237	240	4		GRE quantitative score	0200-088	all years
241	244	4		GRE analytical score	0200-0800	all years
245	250	6		filler		all years
251	252	2		Recoded undergraduate major	0-86	all years
253	254	2		Recoded graduate major	0-86	all years
255	256	2		Recoded broad undergraduate major	0-10	all years
257	258	2		Recoded broad graduate major	0-10	all years
259	259	1		Indicator of change from undergrad. to graduate major	1,2	1=changer, 2=non-changer

Appendix G

Sample Talent Flow Tables:

G-1: Sample Trend Tables
G-2: Sample Broad Matrices of Undergraduate to Graduate Major
G-3: Sample Detailed Matrix of Undergraduate to Graduate Major, first pages

Appendix G-1

Sample Trend Tables

Note: Prior to 1988, the background questionnaire did not ask whether the examinee planned to study full time or part time. The tables show "0.0" for the percent planning full-time study during those years.

Trend Tables for All U.S. Citizens
with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	14,823	15,899	15,937	17,822	18,864	19,124	18,643	18,699	19,133	20,457	19,948	17,798
% of Total	8.9	10.2	10.1	10.0	10.2	9.7	8.4	7.9	7.5	7.4	6.9	6.6
% Non-White	11.6	11.9	12.0	12.2	13.4	14.6	14.7	14.9	15.5	17.1	18.3	18.5
% Female	31.8	31.7	32.7	33.5	33.5	33.3	34.5	34.6	35.1	34.4	36.3	37.0
% Over age 30	10.9	11.0	11.7	12.6	13.8	15.4	15.7	16.7	18.0	17.1	18.4	18.0
% Planning doctorate	47.1	46.3	47.0	47.1	47.1	47.8	47.6	48.5	49.8	51.1	51.5	52.2
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	65.9	65.4	66.0	67.6	69.7	70.2
% Planning same major	68.4	70.2	70.2	68.5	67.3	65.0	60.2	60.4	60.1	59.1	58.2	57.3
% Fathers with 4-year degree	49.8	51.7	52.0	52.5	52.0	51.8	51.5	51.7	52.2	52.3	52.4	52.7
% Mothers with 4-year degree	34.4	36.0	36.5	36.9	36.5	36.9	37.5	38.1	38.7	39.2	40.0	40.7
% GPA B or better in undergraduate major	78.0	77.2	77.7	79.0	78.9	78.6	80.2	79.9	79.9	79.3	80.6	81.0
GRE Verbal Mean	529	532	534	528	530	531	534	537	536	532	530	523
GRE Quantitative Mean	641	642	644	645	649	650	657	661	663	662	656	652
GRE Analytical Mean	585	588	603	606	608	609	613	614	616	613	606	609

Trend Tables for All U.S. Citizens
with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	12,977	14,303	14,171	15,262	15,654	15,584	14,346	14,422	14,922	15,391	14,736	12,776
% of Total	7.8	9.1	9.0	8.6	8.5	7.9	6.5	6.1	5.9	5.6	5.1	4.7
% Non-White	11.1	11.7	11.9	12.2	13.3	14.2	14.4	15.2	15.9	16.3	17.6	17.4
% Female	30.5	29.4	30.1	30.7	30.4	29.1	30.4	29.7	29.7	29.3	31.0	31.3
% Over age 30	11.0	11.7	12.5	13.4	14.6	16.0	17.4	17.7	19.5	17.9	19.0	18.3
% Planning doctorate	44.0	43.1	45.1	45.9	46.9	48.4	48.6	49.8	51.3	52.2	53.4	54.6
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	67.1	66.4	67.1	68.3	71.4	71.8
% From same major	78.1	78.0	78.9	80.0	81.1	79.7	78.3	78.3	77.1	78.5	78.8	79.9
% Fathers with 4-year degree	48.9	51.0	51.5	52.3	51.9	51.3	51.3	51.2	51.8	52.1	52.4	52.4
% Mothers with 4-year degree	33.5	35.0	36.0	36.1	36.0	36.0	37.0	36.8	37.7	38.4	40.0	40.3
% GPA B or better in undergraduate major	79.0	77.6	78.3	80.4	80.4	80.5	83.0	82.5	82.5	81.5	83.6	83.9
GRE Verbal Mean	530	533	536	532	534	534	538	542	538	536	534	529
GRE Quantitative Mean	636	638	642	646	651	653	659	663	664	665	660	656
GRE Analytical Mean	584	586	603	607	611	612	616	617	616	616	609	614

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Trend Tables for Male U.S. Citizens
with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	9,979	10,808	10,661	11,811	12,479	12,694	12,191	12,209	12,390	13,389	12,672	11,194
% of Total	14.0	15.7	15.6	15.4	15.5	14.8	12.8	12.4	11.9	11.8	10.8	10.5
% Non-White	10.5	10.7	10.7	11.0	11.4	12.9	13.3	13.0	14.0	15.1	16.1	16.5
% Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Over age 30	9.9	10.3	10.8	12.1	13.2	15.3	15.7	16.2	17.7	16.9	18.6	18.1
% Planning doctorate	50.4	49.6	50.5	50.5	50.4	51.3	51.1	52.3	53.2	53.9	55.2	55.5
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	69.1	68.3	68.9	69.9	72.6	72.6
% Planning same major	71.2	73.7	73.8	71.8	70.8	69.3	64.4	65.0	65.3	63.8	63.1	62.3
% Fathers with 4-year degree	49.9	52.1	52.0	52.6	53.2	51.9	51.8	52.1	52.7	52.4	53.6	53.6
% Mothers with 4-year degree	34.3	35.5	36.2	36.4	36.1	36.8	37.4	38.3	38.7	38.8	40.5	40.6
% GPA B or better in undergraduate major	77.5	76.9	77.1	78.4	78.5	78.5	80.6	80.2	80.0	79.2	81.6	81.9
GRE Verbal Mean	532	536	538	533	536	537	539	545	544	539	541	535
GRE Quantitative Mean	654	653	654	657	661	662	669	674	676	676	672	668
GRE Analytical Mean	584	586	604	608	610	610	614	617	618	615	608	612

Trend Tables for Male U.S. Citizens
with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	8,926	10,045	9,851	10,536	10,837	10,997	9,972	10,122	10,473	10,853	10,151	8,762
% of Total	12.5	14.6	14.4	13.7	13.4	12.8	10.5	10.3	10.1	9.6	8.7	8.2
% Non-White	9.9	10.7	10.6	11.2	11.6	12.5	12.9	13.4	14.5	14.4	16.0	15.3
% Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Over age 30	10.4	11.2	11.9	13.2	14.3	16.3	17.6	17.4	19.3	18.1	19.1	18.9
% Planning doctorate	47.3	46.3	48.4	49.4	50.2	51.5	51.1	52.8	53.5	54.3	55.4	56.0
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	69.1	68.0	68.6	69.5	72.6	72.4
% From same major	79.7	79.3	79.9	80.5	81.6	80.0	78.7	78.3	77.2	78.7	78.7	79.6
% Fathers with 4-year degree	48.7	51.4	51.6	52.2	53.0	51.4	51.6	51.9	52.1	52.3	53.4	53.0
% Mothers with 4-year degree	33.3	34.9	35.8	35.7	35.8	35.8	36.9	37.3	37.5	38.1	40.2	40.1
% GPA B or better in undergraduate major	78.1	76.9	77.2	79.4	79.5	79.9	82.8	82.5	81.9	80.9	83.7	84.1
GRE Verbal Mean	533	538	541	536	540	541	543	550	545	543	543	538
GRE Quantitative Mean	650	650	653	657	663	664	670	675	675	678	673	670
GRE Analytical Mean	582	585	605	608	613	613	616	619	618	617	610	616

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Trend Tables for Female U.S. Citizens with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	4,718	5,042	5,217	5,966	6,324	6,367	6,425	6,477	6,717	7,029	7,250	6,578
% of Total	5.0	5.8	5.9	6.0	6.1	5.8	5.1	4.7	4.5	4.3	4.2	4.0
% Non-White	14.0	14.3	14.6	14.6	17.5	17.9	17.4	18.6	18.2	21.1	22.1	21.9
% Female	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Over age 30	12.7	12.4	13.4	13.4	14.8	15.5	15.8	17.6	18.5	17.6	17.9	18.0
% Planning doctorate	40.1	39.3	39.7	40.6	40.6	40.9	41.1	41.2	43.7	45.9	45.0	46.6
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	59.9	60.0	60.7	63.3	64.7	66.0
% Planning same major	62.6	62.7	62.7	61.8	60.2	56.4	52.5	51.7	50.7	50.2	49.8	48.9
% Fathers with 4-year degree	49.9	50.7	51.9	52.3	49.9	51.6	51.1	51.0	51.3	52.0	50.4	51.1
% Mothers with 4-year degree	34.9	37.2	37.2	37.9	37.2	37.3	37.6	37.7	38.4	39.9	39.2	40.6
% GPA B or better in undergraduate major	79.3	78.2	79.2	80.2	79.7	79.0	79.5	79.3	79.7	79.5	78.9	79.7
GRE Verbal Mean	522	523	525	519	517	518	522	522	520	518	511	504
GRE Quantitative Mean	616	618	623	621	627	626	635	637	639	634	629	623
GRE Analytical Mean	589	593	602	603	606	607	611	610	611	611	602	604

Trend Tables for Female U.S. Citizens with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	3,952	4,212	4,262	4,681	4,760	4,536	4,355	4,290	4,431	4,510	4,568	3,994
% of Total	4.2	4.8	4.9	4.7	4.6	4.1	3.4	3.1	3.0	2.8	2.6	2.4
% Non-White	13.6	14.0	14.8	14.2	17.2	17.9	17.6	19.2	19.3	21.0	21.3	22.1
% Female	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Over age 30	12.2	12.7	13.8	14.0	15.4	15.1	17.0	18.3	19.9	17.5	18.6	17.0
% Planning doctorate	36.5	35.5	37.5	38.2	39.5	40.9	42.8	42.8	46.1	47.3	48.8	51.5
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	62.6	62.5	63.6	65.4	68.7	70.3
% From same major	74.7	75.1	76.7	78.7	79.9	79.2	77.4	78.1	76.8	78.3	79.0	80.5
% Fathers with 4-year degree	49.4	50.2	51.3	52.6	49.5	51.3	50.6	49.4	51.0	51.6	50.3	51.1
% Mothers with 4-year degree	33.9	35.4	36.3	37.2	36.4	36.6	37.2	35.8	38.0	39.3	39.5	40.6
% GPA B or better in undergraduate major	81.2	79.7	81.0	82.8	82.6	82.1	83.7	82.5	83.9	83.0	83.3	83.6
GRE Verbal Mean	522	523	525	522	519	519	526	523	521	519	515	509
GRE Quantitative Mean	607	610	616	620	624	626	632	633	637	634	630	625
GRE Analytical Mean	588	589	600	605	605	609	614	610	612	612	606	609

Trend Tables for African American U.S. Citizens
with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	581	580	599	737	933	984	1,031	1,023	1,051	1,307	1,501	1,415
% of Total	5.6	6.3	6.8	7.5	9.4	9.0	8.2	7.4	6.8	7.5	7.5	7.5
% Non-White	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Female	50.8	53.4	49.2	51.6	55.7	55.3	50.9	55.7	51.2	53.9	55.4	54.4
% Over age 30	13.9	14.8	14.2	15.5	14.0	15.4	13.3	15.3	19.5	18.4	16.9	16.6
% Planning doctorate	47.5	41.9	45.6	48.0	40.7	41.6	42.7	45.4	46.1	54.7	48.2	52.9
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	56.5	61.9	61.3	66.4	67.0	66.1
% Planning same major	59.7	60.7	61.3	56.0	55.6	56.0	51.6	54.2	51.7	48.0	49.4	49.0
% Fathers with 4-year degree	18.1	23.6	21.9	25.1	27.3	27.0	23.1	27.4	27.5	28.4	27.7	29.0
% Mothers with 4-year degree	22.7	25.0	24.9	29.9	28.8	30.6	26.0	31.6	30.4	30.8	30.0	32.0
% GPA B or better in undergraduate major	55.9	51.6	51.9	57.3	57.4	55.4	59.7	60.4	61.2	64.1	60.6	61.1
GRE Verbal Mean	380	388	394	397	391	390	394	405	402	411	404	398
GRE Quantitative Mean	480	482	485	492	489	484	493	507	508	515	515	508
GRE Analytical Mean	422	430	439	452	447	450	452	453	458	464	460	462

Trend Tables for African American U.S. Citizens
with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	453	503	491	528	647	684	675	706	718	799	930	858
% of Total	4.4	5.4	5.6	5.4	6.5	6.2	5.4	5.1	4.6	4.6	4.7	4.5
% Non-White	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Female	51.9	51.5	47.5	45.5	50.9	49.7	47.6	50.8	45.4	48.6	47.7	50.9
% Over age 30	11.3	12.7	12.6	14.2	14.8	14.6	14.8	18.7	22.4	18.6	16.7	16.6
% Planning doctorate	43.9	36.6	43.8	46.6	41.7	45.9	44.0	44.5	46.9	52.9	50.8	54.2
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	59.6	63.2	66.2	68.8	71.6	69.5
% From same major	76.6	70.0	74.7	78.2	80.2	80.6	78.8	78.5	75.6	78.5	79.7	80.9
% Fathers with 4-year degree	17.4	19.9	21.6	23.5	24.0	25.3	22.7	24.6	27.6	26.5	29.5	27.5
% Mothers with 4-year degree	22.7	22.9	25.1	27.5	26.7	27.5	27.6	27.8	31.6	28.9	31.0	30.9
% GPA B or better in undergraduate major	57.2	53.5	53.8	58.1	60.0	58.2	66.8	64.0	67.5	66.8	65.4	64.7
GRE Verbal Mean	374	387	395	402	395	395	402	409	413	412	412	408
GRE Quantitative Mean	466	468	483	496	491	493	500	503	514	516	526	520
GRE Analytical Mean	423	426	441	451	451	455	457	455	465	464	469	474

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Trend Tables for Mexican American U.S. Citizens
with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	97	131	119	93	114	151	143	156	155	188	225	196
% of Total	4.5	6.8	6.1	3.9	5.0	5.9	4.9	4.8	4.3	4.6	5.0	4.2
% Non-White	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Female	28.9	31.3	40.3	32.3	38.6	27.8	27.3	33.3	36.1	33.0	32.4	35.7
% Over age 30	12.4	13.7	8.4	15.1	14.0	19.2	23.8	14.7	16.8	19.7	20.4	20.4
% Planning doctorate	45.4	37.4	45.4	44.1	46.5	45.0	49.7	44.9	50.3	51.1	57.8	55.1
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	61.5	72.4	67.7	69.7	69.3	73.5
% Planning same major	57.7	70.2	73.9	76.3	59.6	66.9	65.0	66.0	63.9	62.8	53.3	59.7
% Fathers with 4-year degree	16.5	26.7	29.4	28.0	28.1	20.5	19.6	29.5	32.9	29.8	24.9	27.6
% Mothers with 4-year degree	9.3	16.0	13.4	18.3	12.3	9.3	11.9	21.2	18.7	17.0	16.4	15.3
% GPA B or better in undergraduate major	60.8	61.8	76.5	77.4	66.7	66.2	64.3	73.7	66.5	68.6	71.1	70.9
GRE Verbal Mean	464	476	475	467	481	479	485	492	497	486	487	474
GRE Quantitative Mean	586	598	573	596	597	601	607	612	616	625	609	623
GRE Analytical Mean	516	521	516	532	535	537	541	550	551	558	543	558

Trend Tables for Mexican American U.S. Citizens
with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	77	119	108	103	88	121	119	130	124	147	151	149
% of Total	3.6	6.2	5.5	4.3	3.9	4.7	4.1	4.0	3.5	3.6	3.3	3.2
% Non-White	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Female	26.0	26.1	32.4	33.0	27.3	27.3	22.7	32.3	22.6	28.6	25.8	28.2
% Over age 30	11.7	16.0	8.3	17.5	15.9	18.2	20.2	16.2	16.9	19.0	21.2	24.2
% Planning doctorate	44.2	38.7	46.3	37.9	50.0	43.8	50.4	50.8	50.8	58.5	65.6	57.0
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	61.3	70.0	71.8	73.5	77.5	82.6
% From same major	72.7	77.3	81.5	68.9	77.3	83.5	78.2	79.2	79.8	80.3	79.5	78.5
% Fathers with 4-year degree	14.3	26.9	30.6	30.1	30.7	19.8	21.0	27.7	29.8	25.9	24.5	27.5
% Mothers with 4-year degree	10.4	16.0	14.8	18.4	10.2	7.4	11.8	20.8	20.2	19.0	18.5	16.1
% GPA B or better in undergraduate major	62.3	60.5	76.9	75.7	72.7	68.6	69.7	78.5	66.9	73.5	78.1	75.8
GRE Verbal Mean	460	486	492	463	474	476	489	495	503	497	503	487
GRE Quantitative Mean	577	593	574	594	589	604	608	610	631	629	619	630
GRE Analytical Mean	512	526	524	530	533	543	539	553	559	570	558	566

Trend Tables for U.S. Citizens with Five or More Years Since Undergraduate Degree with Undergraduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	1,836	1,806	1,929	2,266	2,624	3,046	2,911	3,225	3,534	3,712	3,859	3,353
% of Total	5.1	5.4	5.4	5.1	5.4	5.9	5.3	5.4	5.5	5.7	5.9	5.5
% Non-White	13.2	13.8	12.6	12.3	12.2	13.7	12.3	13.7	14.9	17.0	17.8	18.0
% Female	36.4	35.5	35.9	35.0	33.9	33.8	34.5	36.9	35.9	36.6	36.0	37.0
% Over age 30	62.7	64.7	62.7	64.3	62.8	65.4	63.8	64.2	64.4	63.3	63.9	64.9
% Planning doctorate	40.4	42.0	41.5	41.9	44.9	43.2	41.5	42.0	40.8	41.9	41.7	41.3
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	45.0	44.6	45.4	46.7	46.3	46.6
% Planning same major	43.7	46.3	45.9	47.2	45.8	43.2	41.9	41.8	41.7	41.5	39.6	38.3
% Fathers with 4-year degree	33.1	34.3	34.9	36.0	38.2	39.5	41.3	40.4	42.6	44.7	44.2	44.3
% Mothers with 4-year degree	23.7	22.3	23.4	23.3	26.9	27.5	29.6	28.8	30.1	31.4	30.6	30.7
% GPA B or better in undergraduate major	66.7	67.2	67.6	69.4	71.9	71.1	75.0	76.2	75.4	74.8	75.2	74.7
GRE Verbal Mean	551	548	560	552	559	559	562	563	557	550	550	545
GRE Quantitative Mean	644	647	651	649	651	648	662	658	655	647	644	641
GRE Analytical Mean	558	554	581	579	588	582	592	590	588	581	575	580

Trend Tables for U.S. Citizens with Five or More Years Since Undergraduate Degree with Intended Graduate Major in Mathematics, Physical and Computer Sciences

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N Examinees	1,690	1,761	1,906	2,224	2,434	2,672	2,562	2,658	2,864	2,880	2,827	2,375
% of Total	4.7	5.3	5.3	5.1	5.1	5.2	4.6	4.4	4.5	4.5	4.3	3.9
% Non-White	11.3	12.3	12.7	12.2	12.2	13.8	13.0	14.4	15.4	15.2	16.5	16.4
% Female	35.6	32.8	33.3	33.0	30.2	28.5	30.9	30.1	29.8	28.6	30.6	27.7
% Over age 30	57.6	59.9	60.2	59.6	59.3	62.2	63.5	63.2	66.7	62.9	65.2	65.1
% Planning doctorate	30.4	32.2	32.8	34.8	39.1	37.0	35.2	37.6	37.5	38.5	38.4	38.4
% Planning full-time study	0.0	0.0	0.0	0.0	0.0	0.0	44.9	43.1	43.8	44.3	43.4	45.1
% From same major	47.5	47.5	46.4	48.1	49.4	49.3	47.6	50.8	51.4	53.4	54.1	54.1
% Fathers with 4-year degree	35.2	39.0	39.3	39.9	41.4	40.2	43.8	41.8	43.5	47.0	44.4	45.0
% Mothers with 4-year degree	24.4	24.3	27.5	25.5	28.9	27.7	31.0	28.5	30.1	31.9	30.4	31.7
% GPA B or better in undergraduate major	69.9	69.8	69.7	72.2	73.9	72.9	78.0	78.7	77.9	77.2	79.1	76.7
GRE Verbal Mean	557	559	569	559	567	566	565	565	555	554	551	549
GRE Quantitative Mean	632	639	644	642	644	645	651	649	647	649	642	641
GRE Analytical Mean	560	561	589	586	596	589	596	593	586	587	580	584

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Appendix G-2

Sample Broad Matrices of Undergraduate to Graduate Major

1993 Number of
U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	22,618	166	109	138	1,410	50	746	406	1,251	408	27,302
02 Mathematics, Physical and Computer Sciences	200	10,205	913	279	286	42	168	382	169	132	12,776
03 Engineering	57	1,102	13,524	280	103	32	28	120	171	153	15,570
04 Biological Sciences	327	807	211	12,881	808	362	202	245	436	179	16,458
05 Social Sciences and Psychology	3,267	422	247	548	35,097	325	947	1,442	2,059	629	44,983
06 Health Sciences and Services	1,243	530	238	5,978	3,052	17,169	1,682	1,066	1,485	422	32,865
07 Education	5,377	1,177	235	973	5,567	500	17,537	2,135	2,922	559	36,982
08 Business	299	198	347	122	794	108	103	1,704	385	101	4,161
09 All Other Fields	5,129	384	358	594	6,647	314	1,292	1,731	11,913	413	28,775
10 Missing	7,264	2,807	2,731	4,145	9,790	1,632	4,080	2,015	4,007	11,871	50,342
TOTAL	45,781	17,798	18,913	25,938	63,554	20,534	26,785	11,246	24,798	14,867	270,214

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	49.40	0.93	0.58	0.53	2.22	0.24	2.79	3.61	5.04	2.74	10.10
02 Mathematics, Physical and Computer Sciences	0.44	57.34	4.83	1.08	0.45	0.20	0.63	3.40	0.68	0.89	4.73
03 Engineering	0.12	6.19	71.51	1.08	0.16	0.16	0.10	1.07	0.69	1.03	5.76
04 Biological Sciences	0.71	4.53	1.12	49.66	1.27	1.76	0.75	2.18	1.76	1.20	6.09
05 Social Sciences and Psychology	7.14	2.37	1.31	2.11	55.22	1.58	3.54	12.82	8.30	4.23	16.65
06 Health Sciences and Services	2.72	2.98	1.26	23.05	4.80	83.61	6.28	9.48	5.99	2.84	12.16
07 Education	11.75	6.61	1.24	3.75	8.76	2.43	65.47	18.98	11.78	3.76	13.69
08 Business	0.65	1.11	1.83	0.47	1.25	0.53	0.38	15.15	1.55	0.68	1.54
09 All Other Fields	11.20	2.16	1.89	2.29	10.46	1.53	4.82	15.39	48.04	2.78	10.65
10 Missing	15.87	15.77	14.44	15.98	15.40	7.95	15.23	17.92	16.16	79.85	18.63
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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1993 Number of
Male U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	10,029	115	82	64	719	14	240	218	494	168	12,143
02 Mathematics, Physical and Computer Sciences	119	6,972	768	175	181	19	71	257	107	93	8,762
03 Engineering	38	790	11,111	184	73	16	17	89	116	125	12,559
04 Biological Sciences	144	441	153	6,135	356	128	80	130	177	82	7,826
05 Social Sciences and Psychology	1,260	238	194	221	12,708	37	193	718	648	250	16,467
06 Health Sciences and Services	260	220	145	1,860	672	2,359	422	404	305	93	6,740
07 Education	1,532	470	155	388	1,540	73	3,591	779	716	171	9,415
08 Business	122	127	286	66	387	32	38	934	157	63	2,212
09 All Other Fields	1,725	204	275	254	2,172	53	250	806	4,300	141	10,180
10 Missing	2,662	1,617	2,185	1,737	3,349	282	848	998	1,416	5,092	20,186
TOTAL	17,891	11,194	15,354	11,084	22,157	3,013	5,750	5,333	8,436	6,278	106,490

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
Male U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	56.06	1.03	0.53	0.58	3.25	0.46	4.17	4.09	5.86	2.68	11.40
02 Mathematics, Physical and Computer Sciences	0.67	62.28	5.00	1.58	0.82	0.63	1.23	4.82	1.27	1.48	8.23
03 Engineering	0.21	7.06	72.37	1.66	0.33	0.53	0.30	1.67	1.38	1.99	11.79
04 Biological Sciences	0.80	3.94	1.00	55.35	1.61	4.25	1.39	2.44	2.10	1.31	7.35
05 Social Sciences and Psychology	7.04	2.13	1.26	1.99	57.35	1.23	3.36	13.46	7.68	3.98	15.46
06 Health Sciences and Services	1.45	1.97	0.94	16.78	3.03	78.29	7.34	7.58	3.62	1.48	6.33
07 Education	8.56	4.20	1.01	3.50	6.95	2.42	62.45	14.61	8.49	2.72	8.84
08 Business	0.68	1.13	1.86	0.60	1.75	1.06	0.66	17.51	1.86	1.00	2.08
09 All Other Fields	9.64	1.82	1.79	2.29	9.80	1.76	4.35	15.11	50.97	2.25	9.56
10 Missing	14.88	14.45	14.23	15.67	15.11	9.36	14.75	18.71	16.79	81.11	18.96
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are Male

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	44.34	69.28	75.23	46.38	50.99	28.00	32.17	53.69	39.49	41.18	44.48
02 Mathematics, Physical and Computer Sciences	59.50	68.32	84.12	62.72	63.29	45.24	42.26	67.28	63.31	70.45	68.58
03 Engineering	66.67	71.69	82.16	65.71	70.87	50.00	60.71	74.17	67.84	81.70	80.66
04 Biological Sciences	44.04	54.65	72.51	47.63	44.06	35.36	39.60	53.06	40.60	45.81	47.55
05 Social Sciences and Psychology	38.57	56.40	78.54	40.33	36.21	11.38	20.38	49.79	31.47	39.75	36.61
06 Health Sciences and Services	20.92	41.51	60.92	31.11	22.02	13.74	25.09	37.90	20.54	22.04	20.51
07 Education	28.49	39.93	65.96	39.88	27.66	14.60	20.48	36.49	24.50	30.59	25.46
08 Business	40.80	64.14	82.42	54.10	48.74	29.63	36.89	54.81	40.78	62.38	53.16
09 All Other Fields	33.63	53.13	76.82	42.76	32.68	16.88	19.35	46.56	36.10	34.14	35.38
10 Missing	36.65	57.61	80.01	41.91	34.21	17.28	20.78	49.53	35.34	42.89	40.18
TOTAL	39.08	62.89	81.18	42.73	34.86	14.67	21.47	47.42	34.02	42.23	39.41

1993 Number of Female U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	12,559	50	26	74	689	36	506	188	755	238	15,121
02 Mathematics, Physical and Computer Sciences	81	3,217	143	104	103	23	97	125	62	39	3,994
03 Engineering	19	309	2,402	96	30	16	11	31	55	27	2,996
04 Biological Sciences	183	366	58	6,728	450	234	122	115	259	95	8,610
05 Social Sciences and Psychology	2,003	184	53	327	22,356	288	752	720	1,407	378	28,468
06 Health Sciences and Services	978	309	93	4,111	2,376	14,790	1,258	660	1,176	327	26,078
07 Education	3,837	705	79	585	4,014	426	13,920	1,354	2,203	386	27,509
08 Business	177	71	61	55	407	76	65	769	228	38	1,947
09 All Other Fields	3,396	179	82	340	4,466	261	1,042	922	7,599	271	18,558
10 Missing	4,583	1,188	544	2,402	6,424	1,346	3,225	1,015	2,585	6,727	30,039
TOTAL	27,816	6,578	3,541	14,822	41,315	17,496	20,998	5,899	16,329	8,526	163,320

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for Female U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	45.15	0.76	0.73	0.50	1.67	0.21	2.41	3.19	4.62	2.79	9.26
02 Mathematics, Physical and Computer Sciences	0.29	48.91	4.04	0.70	0.25	0.13	0.46	2.12	0.38	0.46	2.45
03 Engineering	0.07	4.70	67.83	0.65	0.07	0.09	0.05	0.53	0.34	0.32	1.83
04 Biological Sciences	0.66	5.56	1.64	45.39	1.09	1.34	0.58	1.95	1.59	1.11	5.27
05 Social Sciences and Psychology	7.20	2.80	1.50	2.21	54.11	1.65	3.58	12.21	8.62	4.43	17.43
06 Health Sciences and Services	3.52	4.70	2.63	27.74	5.75	84.53	5.99	11.19	7.20	3.84	15.97
07 Education	13.79	10.72	2.23	3.95	9.72	2.43	66.29	22.95	13.49	4.53	16.84
08 Business	0.64	1.08	1.72	0.37	0.99	0.43	0.31	13.04	1.40	0.45	1.19
09 All Other Fields	12.21	2.72	2.32	2.29	10.81	1.49	4.96	15.63	46.54	3.18	11.36
10 Missing	16.48	18.06	15.36	16.21	15.55	7.69	15.36	17.21	15.83	78.90	18.39
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens Who Are Female

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	55.53	30.12	23.85	53.62	48.87	72.00	67.83	46.31	60.35	58.33	55.38
02 Mathematics, Physical and Computer Sciences	40.50	31.52	15.66	37.28	36.01	54.76	57.74	32.72	36.69	29.55	31.26
03 Engineering	33.33	28.04	17.76	34.24	29.13	50.00	39.29	25.83	32.16	17.65	19.24
04 Biological Sciences	55.96	45.35	27.49	52.23	55.69	64.64	60.40	46.94	59.40	53.07	52.31
05 Social Sciences and Psychology	61.31	43.60	21.46	59.67	63.70	88.62	79.41	49.93	68.33	60.10	63.29
06 Health Sciences and Services	78.68	58.30	39.08	68.77	77.85	86.14	74.79	61.91	79.19	77.49	79.35
07 Education	71.36	59.90	33.62	60.12	72.10	85.20	79.38	63.42	75.39	69.05	74.38
08 Business	59.20	35.86	17.58	45.08	51.26	70.37	63.11	45.13	59.22	37.62	46.79
09 All Other Fields	66.21	46.61	22.91	57.24	67.19	83.12	80.65	53.26	63.79	65.62	64.49
10 Missing	63.09	42.32	19.92	57.95	65.62	82.48	79.04	50.37	64.51	56.67	59.67
TOTAL	60.76	36.96	18.72	57.14	65.01	85.21	78.39	52.45	65.85	57.35	60.44

1993 Number of
American Indian U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	108	1	0	0	6	0	6	1	5	2	129
02 Mathematics, Physical and Computer Sciences	0	48	1	3	2	0	2	3	1	0	60
03 Engineering	0	5	43	0	0	1	0	2	4	0	55
04 Biological Sciences	1	4	0	59	3	1	2	2	6	1	79
05 Social Sciences and Psychology	23	2	1	2	239	3	6	9	19	5	309
06 Health Sciences and Services	7	6	2	34	11	93	8	3	7	2	173
07 Education	32	6	0	7	32	6	114	11	12	11	231
08 Business	2	1	4	0	5	0	0	7	4	0	23
09 All Other Fields	16	1	0	3	35	0	7	11	74	0	147
10 Missing	21	11	7	20	51	15	16	15	25	65	246
TOTAL	210	85	58	128	384	119	161	64	157	86	1,452

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
American Indian U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	51.43	1.18	0.00	0.00	1.56	0.00	3.73	1.56	3.18	2.33	8.88
02 Mathematics, Physical and Computer Sciences	0.00	56.47	1.72	2.34	0.52	0.00	1.24	4.69	0.64	0.00	4.13
03 Engineering	0.00	5.88	74.14	0.00	0.00	0.84	0.00	3.13	2.55	0.00	3.79
04 Biological Sciences	0.48	4.71	0.00	46.09	0.78	0.84	1.24	3.13	3.82	1.16	5.44
05 Social Sciences and Psychology	10.95	2.35	1.72	1.56	62.24	2.52	3.73	14.06	12.10	5.81	21.28
06 Health Sciences and Services	3.33	7.06	3.45	26.56	2.86	78.15	4.97	4.69	4.46	2.33	11.91
07 Education	15.24	7.06	0.00	5.47	8.33	5.04	70.81	17.19	7.64	12.79	15.91
08 Business	0.95	1.18	6.90	0.00	1.30	0.00	0.00	10.94	2.55	0.00	1.58
09 All Other Fields	7.62	1.18	0.00	2.34	9.11	0.00	4.35	17.19	47.13	0.00	10.12
10 Missing	10.00	12.94	12.07	15.63	13.28	12.61	9.94	23.44	15.92	75.58	16.94
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are American Indian

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	0.48	0.60	0.00	0.00	0.43	0.00	0.80	0.25	0.40	0.49	0.47
02 Mathematics, Physical and Computer Sciences	0.00	0.47	0.11	1.08	0.70	0.00	1.19	0.79	0.59	0.00	0.47
03 Engineering	0.00	0.45	0.32	0.00	0.00	3.13	0.00	1.67	2.34	0.00	0.35
04 Biological Sciences	0.31	0.50	0.00	0.46	0.37	0.28	0.99	0.82	1.38	0.56	0.48
05 Social Sciences and Psychology	0.70	0.47	0.40	0.36	0.68	0.92	0.63	0.62	0.92	0.79	0.69
06 Health Sciences and Services	0.56	1.13	0.84	0.57	0.36	0.54	0.48	0.28	0.47	0.47	0.53
07 Education	0.60	0.51	0.00	0.72	0.57	1.20	0.65	0.52	0.41	1.97	0.62
08 Business	0.67	0.51	1.15	0.00	0.63	0.00	0.00	0.41	1.04	0.00	0.55
09 All Other Fields	0.31	0.26	0.00	0.51	0.53	0.00	0.54	0.64	0.62	0.00	0.51
10 Missing	0.29	0.39	0.26	0.48	0.52	0.92	0.39	0.74	0.62	0.55	0.49
TOTAL	0.46	0.48	0.31	0.49	0.60	0.58	0.60	0.57	0.63	0.58	0.54

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1993 Number of
African American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	786	7	6	6	53	1	33	25	90	10	1,017
02 Mathematics, Physical and Computer Sciences	9	694	50	17	21	2	13	35	9	8	858
03 Engineering	1	126	710	6	11	1	3	11	17	12	898
04 Biological Sciences	8	68	6	591	21	23	6	5	13	11	752
05 Social Sciences and Psychology	166	28	15	33	2,805	38	60	141	198	55	3,539
06 Health Sciences and Services	62	52	11	317	198	887	48	61	98	23	1,757
07 Education	348	123	19	82	632	48	1,185	324	331	79	3,171
08 Business	30	31	28	16	69	18	6	285	41	13	537
09 All Other Fields	307	27	29	33	714	34	76	239	1,251	48	2,758
10 Missing	285	259	158	217	842	135	249	323	377	837	3,682
TOTAL	2,002	1,415	1,032	1,318	5,366	1,187	1,679	1,449	2,425	1,096	18,969

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
African American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	39.26	0.49	0.58	0.46	0.99	0.08	1.97	1.73	3.71	0.91	5.36
02 Mathematics, Physical and Computer Sciences	0.45	49.05	4.84	1.29	0.39	0.17	0.77	2.42	0.37	0.73	4.52
03 Engineering	0.05	8.90	68.80	0.46	0.20	0.08	0.18	0.76	0.70	1.09	4.73
04 Biological Sciences	0.40	4.81	0.58	44.84	0.39	1.94	0.36	0.35	0.54	1.00	3.96
05 Social Sciences and Psychology	8.29	1.98	1.45	2.50	52.27	3.20	3.57	9.73	8.16	5.02	18.66
06 Health Sciences and Services	3.10	3.67	1.07	24.05	3.69	74.73	2.86	4.21	4.04	2.10	9.26
07 Education	17.38	8.69	1.84	6.22	11.78	4.04	70.58	22.36	13.65	7.21	16.72
08 Business	1.50	2.19	2.71	1.21	1.29	1.52	0.36	19.67	1.69	1.19	2.83
09 All Other Fields	15.33	1.91	2.81	2.50	13.31	2.86	4.53	16.49	51.59	4.38	14.54
10 Missing	14.24	18.30	15.31	16.46	15.69	11.37	14.83	22.29	15.55	76.37	19.41
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are African American

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	3.48	4.22	5.50	4.35	3.76	2.00	4.42	6.16	7.19	2.45	3.73
02 Mathematics, Physical and Computer Sciences	4.50	6.80	5.48	6.09	7.34	4.76	7.74	9.16	5.33	6.06	6.72
03 Engineering	1.75	11.43	5.25	2.14	10.68	3.13	10.71	9.17	9.94	7.84	5.77
04 Biological Sciences	2.45	8.43	2.84	4.59	2.60	6.35	2.97	2.04	2.98	6.15	4.57
05 Social Sciences and Psychology	5.08	6.64	6.07	6.02	7.99	11.69	6.34	9.78	9.62	8.74	7.87
06 Health Sciences and Services	4.99	9.81	4.62	5.30	6.49	5.17	2.85	5.72	6.60	5.45	5.35
07 Education	6.47	10.45	8.09	8.43	11.35	9.60	6.76	15.18	11.33	14.13	8.57
08 Business	10.03	15.66	8.07	13.11	8.69	16.67	5.83	16.73	10.65	12.87	12.91
09 All Other Fields	5.99	7.03	8.10	5.56	10.74	10.83	5.88	13.81	10.50	11.62	9.58
10 Missing	3.92	9.23	5.79	5.24	8.60	8.27	6.10	16.03	9.41	7.05	7.31
TOTAL	4.37	7.95	5.46	5.08	8.44	5.78	6.27	12.88	9.78	7.37	7.02

1993 Number of
Puerto Rican U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR										TOTAL
	01	02	03	04	05	06	07	08	09	10	
01 Arts, Humanities, and History	208	0	1	2	12	0	11	6	9	2	251
02 Mathematics, Physical and Computer Sciences	1	102	10	3	3	2	2	8	1	2	134
03 Engineering	0	13	211	0	2	0	0	1	2	4	233
04 Biological Sciences	0	14	3	170	7	8	2	0	5	0	209
05 Social Sciences and Psychology	22	2	1	6	361	0	7	24	27	3	453
06 Health Sciences and Services	11	13	3	90	15	117	10	13	14	6	292
07 Education	56	11	4	6	48	6	101	13	19	6	270
08 Business	3	3	4	2	9	1	1	32	3	2	60
09 All Other Fields	45	6	4	3	63	2	8	18	132	8	289
10 Missing	45	21	32	55	73	12	17	13	35	61	364
TOTAL	391	185	273	337	593	148	159	128	247	94	2,555

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
Puerto Rican U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR										TOTAL
	01	02	03	04	05	06	07	08	09	10	
01 Arts, Humanities, and History	53.20	0.00	0.37	0.59	2.02	0.00	6.92	4.69	3.64	2.13	9.82
02 Mathematics, Physical and Computer Sciences	0.26	55.14	3.66	0.89	0.51	1.35	1.26	6.25	0.40	2.13	5.24
03 Engineering	0.00	7.03	77.29	0.00	0.34	0.00	0.00	0.78	0.81	4.26	9.12
04 Biological Sciences	0.00	7.57	1.10	50.45	1.18	5.41	1.26	0.00	2.02	0.00	8.18
05 Social Sciences and Psychology	5.63	1.08	0.37	1.78	60.88	0.00	4.40	18.75	10.93	3.19	17.73
06 Health Sciences and Services	2.81	7.03	1.10	26.71	2.53	79.05	6.29	10.16	5.67	6.38	11.43
07 Education	14.32	5.95	1.47	1.78	8.09	4.05	63.52	10.16	7.69	6.38	10.57
08 Business	0.77	1.62	1.47	0.59	1.52	0.68	0.63	25.00	1.21	2.13	2.35
09 All Other Fields	11.51	3.24	1.47	0.89	10.62	1.35	5.03	14.06	53.44	8.51	11.31
10 Missing	11.51	11.35	11.72	16.32	12.31	8.11	10.69	10.16	14.17	64.89	14.25
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are Puerto Rican

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR										TOTAL
	01	02	03	04	05	06	07	08	09	10	
01 Arts, Humanities, and History	0.92	0.00	0.92	1.45	0.85	0.00	1.47	1.48	0.72	0.49	0.92
02 Mathematics, Physical and Computer Sciences	0.50	1.00	1.10	1.08	1.05	4.76	1.19	2.09	0.59	1.52	1.05
03 Engineering	0.00	1.18	1.56	0.00	1.94	0.00	0.00	0.83	1.17	2.61	1.50
04 Biological Sciences	0.00	1.73	1.42	1.32	0.87	2.21	0.99	0.00	1.15	0.00	1.27
05 Social Sciences and Psychology	0.67	0.47	0.40	1.09	1.03	0.00	0.74	1.66	1.31	0.48	1.01
06 Health Sciences and Services	0.88	2.45	1.26	1.51	0.49	0.68	0.59	1.22	0.94	1.42	0.89
07 Education	1.04	0.93	1.70	0.62	0.86	1.20	0.58	0.61	0.65	1.07	0.73
08 Business	1.00	1.52	1.15	1.64	1.13	0.93	0.97	1.88	0.78	1.98	1.44
09 All Other Fields	0.88	1.56	1.12	0.51	0.95	0.64	0.62	1.04	1.11	1.94	1.00
10 Missing	0.62	0.75	1.17	1.33	0.75	0.74	0.42	0.65	0.87	0.51	0.72
TOTAL	0.85	1.04	1.44	1.30	0.93	0.72	0.59	1.14	1.00	0.63	0.95

1993 Number of
Asian American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	559	5	6	5	36	1	7	10	26	8	663
02 Mathematics, Physical and Computer Sciences	6	497	92	16	12	2	4	15	3	4	651
03 Engineering	2	72	1,457	17	2	1	1	4	5	9	1,570
04 Biological Sciences	10	44	11	565	24	16	2	7	12	5	696
05 Social Sciences and Psychology	99	17	20	29	1,011	7	7	34	38	13	1,275
06 Health Sciences and Services	32	27	25	306	125	373	31	24	45	5	993
07 Education	96	33	8	21	160	7	145	34	45	4	553
08 Business	7	13	27	4	24	2	0	45	6	5	133
09 All Other Fields	129	19	26	24	234	7	17	46	319	4	825
10 Missing	192	147	281	214	328	54	37	42	94	318	1,707
TOTAL	1,132	874	1,953	1,201	1,956	470	251	261	593	375	9,066

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
Asian American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	49.38	0.57	0.31	0.42	1.84	0.21	2.79	3.83	4.38	2.13	7.31
02 Mathematics, Physical and Computer Sciences	0.53	56.86	4.71	1.33	0.61	0.43	1.59	5.75	0.51	1.07	7.18
03 Engineering	0.18	8.24	74.60	1.42	0.10	0.21	0.40	1.53	0.84	2.40	17.32
04 Biological Sciences	0.88	5.03	0.56	47.04	1.23	3.40	0.80	2.68	2.02	1.33	7.68
05 Social Sciences and Psychology	8.75	1.95	1.02	2.41	51.69	1.49	2.79	13.03	6.41	3.47	14.06
06 Health Sciences and Services	2.83	3.09	1.28	25.48	6.39	79.36	12.35	9.20	7.59	1.33	10.95
07 Education	8.48	3.78	0.41	1.75	8.18	1.49	57.77	13.03	7.59	1.07	6.10
08 Business	0.62	1.49	1.38	0.33	1.23	0.43	0.00	17.24	1.01	1.33	1.47
09 All Other Fields	11.40	2.17	1.33	2.00	11.96	1.49	6.77	17.62	53.79	1.07	9.10
10 Missing	16.96	16.82	14.39	17.82	16.77	11.49	14.74	16.09	15.85	84.80	18.83
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are Asian American

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	2.47	3.01	5.50	3.62	2.55	2.00	0.94	2.46	2.08	1.96	2.43
02 Mathematics, Physical and Computer Sciences	3.00	4.87	10.08	5.73	4.20	4.76	2.38	3.93	1.78	3.03	5.10
03 Engineering	3.51	6.53	10.77	6.07	1.94	3.13	3.57	3.33	2.92	5.88	10.08
04 Biological Sciences	3.06	5.45	5.21	4.39	2.97	4.42	0.99	2.86	2.75	2.79	4.23
05 Social Sciences and Psychology	3.03	4.03	8.10	5.29	2.88	2.15	0.74	2.36	1.85	2.07	2.83
06 Health Sciences and Services	2.57	5.09	10.50	5.12	4.10	2.17	1.84	2.25	3.03	1.18	3.02
07 Education	1.79	2.80	3.40	2.16	2.87	1.40	0.83	1.59	1.54	0.72	1.50
08 Business	2.34	6.57	7.78	3.28	3.02	1.85	0.00	2.64	1.56	4.95	3.20
09 All Other Fields	2.52	4.95	7.26	4.04	3.52	2.23	1.32	2.66	2.68	0.97	2.87
10 Missing	2.64	5.24	10.29	5.16	3.35	3.31	0.91	2.08	2.35	2.68	3.39
TOTAL	2.47	4.91	10.33	4.63	3.08	2.29	0.94	2.32	2.39	2.52	3.36

1993 Number of
Mexican American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	372	0	1	1	20	0	11	5	22	6	438
02 Mathematics, Physical and Computer Sciences	2	117	10	3	8	0	1	4	2	2	149
03 Engineering	1	8	269	5	0	0	2	0	1	1	287
04 Biological Sciences	0	6	4	211	7	6	0	3	2	0	239
05 Social Sciences and Psychology	53	6	1	14	723	2	11	18	40	9	877
06 Health Sciences and Services	12	4	2	101	48	237	22	9	15	9	459
07 Education	126	22	0	28	159	14	444	54	45	18	910
08 Business	4	3	4	1	10	2	3	42	4	1	74
09 All Other Fields	78	4	5	7	161	7	22	34	209	10	537
10 Missing	98	26	38	43	159	23	100	29	48	169	733
TOTAL	746	196	334	414	1,295	291	616	198	388	225	4,703

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
Mexican American U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	49.87	0.00	0.30	0.24	1.54	0.00	1.79	2.53	5.67	2.67	9.31
02 Mathematics, Physical and Computer Sciences	0.27	59.69	2.99	0.72	0.62	0.00	0.16	2.02	0.52	0.89	3.17
03 Engineering	0.13	4.08	80.54	1.21	0.00	0.00	0.32	0.00	0.26	0.44	6.10
04 Biological Sciences	0.00	3.06	1.20	50.97	0.54	2.06	0.00	1.52	0.52	0.00	5.08
05 Social Sciences and Psychology	7.10	3.06	0.30	3.38	55.83	0.69	1.79	9.09	10.31	4.00	18.65
06 Health Sciences and Services	1.61	2.04	0.60	24.40	3.71	81.44	3.57	4.55	3.87	4.00	9.76
07 Education	16.89	11.22	0.00	6.76	12.28	4.81	72.08	27.27	11.60	8.00	19.35
08 Business	0.54	1.53	1.20	0.24	0.77	0.69	0.49	21.21	1.03	0.44	1.57
09 All Other Fields	10.46	2.04	1.50	1.69	12.43	2.41	3.57	17.17	53.87	4.44	11.42
10 Missing	13.14	13.27	11.38	10.39	12.28	7.90	16.23	14.65	12.37	75.11	15.59
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are Mexican American

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	1.64	0.00	0.92	0.72	1.42	0.00	1.47	1.23	1.76	1.47	1.60
02 Mathematics, Physical and Computer Sciences	1.00	1.15	1.10	1.08	2.80	0.00	0.60	1.05	1.18	1.52	1.17
03 Engineering	1.75	0.73	1.99	1.79	0.00	0.00	7.14	0.00	0.58	0.65	1.84
04 Biological Sciences	0.00	0.74	1.90	1.64	0.87	1.66	0.00	1.22	0.46	0.00	1.45
05 Social Sciences and Psychology	1.62	1.42	0.40	2.55	2.06	0.62	1.16	1.25	1.94	1.43	1.95
06 Health Sciences and Services	0.97	0.75	0.84	1.69	1.57	1.38	1.31	0.84	1.01	2.13	1.40
07 Education	2.34	1.87	0.00	2.88	2.86	2.80	2.53	2.53	1.54	3.22	2.46
08 Business	1.34	1.52	1.15	0.82	1.26	1.85	2.91	2.46	1.04	0.99	1.78
09 All Other Fields	1.52	1.04	1.40	1.18	2.42	2.23	1.70	1.96	1.75	2.42	1.87
10 Missing	1.35	0.93	1.39	1.04	1.62	1.41	2.45	1.44	1.20	1.42	1.46
TOTAL	1.63	1.10	1.77	1.60	2.04	1.42	2.30	1.76	1.56	1.51	1.74

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1993 Number of
Other Hispanic U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	378	2	3	5	32	1	22	5	22	7	477
02 Mathematics, Physical and Computer Sciences	0	116	17	5	0	0	1	8	1	4	152
03 Engineering	2	18	257	5	0	0	2	2	1	7	294
04 Biological Sciences	4	9	2	167	9	7	1	2	2	5	208
05 Social Sciences and Psychology	69	6	6	10	772	4	16	32	53	10	978
06 Health Sciences and Services	23	8	4	106	61	184	15	10	17	12	440
07 Education	133	11	4	10	110	6	252	36	45	6	613
08 Business	8	5	15	2	20	2	1	26	4	0	83
09 All Other Fields	87	2	1	9	139	4	9	23	170	8	452
10 Missing	105	39	41	49	156	17	46	20	58	145	676
TOTAL	809	216	350	368	1,299	225	365	164	373	204	4,373

For 1993, of Those with Each Undergraduate Major, the Percent Selecting Each Graduate Major for
Other Hispanic U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	46.72	0.93	0.86	1.36	2.46	0.44	6.03	3.05	5.90	3.43	10.91
02 Mathematics, Physical and Computer Sciences	0.00	53.70	4.86	1.36	0.00	0.00	0.27	4.88	0.27	1.96	3.48
03 Engineering	0.25	8.33	73.43	1.36	0.00	0.00	0.55	1.22	0.27	3.43	6.72
04 Biological Sciences	0.49	4.17	0.57	45.38	0.69	3.11	0.27	1.22	0.54	2.45	4.76
05 Social Sciences and Psychology	8.53	2.78	1.71	2.72	59.43	1.78	4.38	19.51	14.21	4.90	22.36
06 Health Sciences and Services	2.84	3.70	1.14	28.80	4.70	81.78	4.11	6.10	4.56	5.88	10.06
07 Education	16.44	5.09	1.14	2.72	8.47	2.67	69.04	21.95	12.06	2.94	14.02
08 Business	0.99	2.31	4.29	0.54	1.54	0.89	0.27	15.85	1.07	0.00	1.90
09 All Other Fields	10.75	0.93	0.29	2.45	10.70	1.78	2.47	14.02	45.58	3.92	10.34
10 Missing	12.98	18.06	11.71	13.32	12.01	7.56	12.60	12.20	15.55	71.08	15.46
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1993 Percent of U.S. Citizens
Who Are Other Hispanic

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	1.67	1.20	2.75	3.62	2.27	2.00	2.95	1.23	1.76	1.72	1.75
02 Mathematics, Physical and Computer Sciences	0.00	1.14	1.86	1.79	0.00	0.00	0.60	2.09	0.59	3.03	1.19
03 Engineering	3.51	1.63	1.90	1.79	0.00	0.00	7.14	1.67	0.58	4.58	1.89
04 Biological Sciences	1.22	1.12	0.95	1.30	1.11	1.93	0.50	0.82	0.46	2.79	1.26
05 Social Sciences and Psychology	2.11	1.42	2.43	1.82	2.20	1.23	1.69	2.22	2.57	1.59	2.17
06 Health Sciences and Services	1.85	1.51	1.68	1.77	2.00	1.07	0.89	0.94	1.14	2.84	1.34
07 Education	2.47	0.93	1.70	1.03	1.98	1.20	1.44	1.69	1.54	1.07	1.66
08 Business	2.68	2.53	4.32	1.64	2.52	1.85	0.97	1.53	1.04	0.00	1.99
09 All Other Fields	1.70	0.52	0.28	1.52	2.09	1.27	0.70	1.33	1.43	1.94	1.57
10 Missing	1.45	1.39	1.50	1.18	1.59	1.04	1.13	0.99	1.45	1.22	1.34
TOTAL	1.77	1.21	1.85	1.42	2.04	1.10	1.36	1.46	1.50	1.37	1.62

1993 Mean GRE Verbal Scores for U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	556	603	605	601	565	539	504	540	548	555	555
02 Mathematics, Physical and Computer Sciences	592	529	538	535	553	470	480	496	534	530	529
03 Engineering	572	515	513	530	545	495	421	471	491	494	513
04 Biological Sciences	567	525	537	505	536	479	475	488	501	527	508
05 Social Sciences and Psychology	560	565	560	534	496	490	471	490	497	500	501
06 Health Sciences and Services	534	500	509	483	485	454	438	469	460	467	466
07 Education	513	490	523	493	474	463	428	446	458	445	456
08 Business	520	491	496	465	501	470	459	440	464	463	469
09 All Other Fields	546	537	538	516	490	470	472	470	465	485	489
10 Missing	549	515	517	503	490	445	430	440	476	508	497
TOTAL	548	523	517	501	494	455	436	462	473	505	496

1993 Mean GRE Quantitative Scores for U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	522	667	681	579	536	499	476	542	508	518	522
02 Mathematics, Physical and Computer Sciences	614	662	685	610	606	551	622	589	596	644	656
03 Engineering	606	652	686	621	611	572	534	572	605	644	679
04 Biological Sciences	567	627	664	573	575	543	511	560	543	562	574
05 Social Sciences and Psychology	529	646	660	561	516	464	460	528	485	505	517
06 Health Sciences and Services	524	607	636	558	518	473	492	529	488	499	502
07 Education	491	639	634	535	485	462	450	494	458	457	474
08 Business	531	605	646	516	540	465	482	502	488	520	526
09 All Other Fields	512	628	644	548	490	463	458	512	478	479	493
10 Missing	530	643	675	570	513	465	453	494	494	527	531
TOTAL	520	652	681	568	512	473	457	513	484	524	529

1993 Mean GRE Analytical Scores for U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	TOTAL
01 Arts, Humanities, and History	570	630	629	581	572	535	526	563	556	556	569
02 Mathematics, Physical and Computer Sciences	598	619	610	594	597	521	576	568	572	599	614
03 Engineering	580	596	611	590	582	563	496	551	567	579	608
04 Biological Sciences	588	597	605	577	594	546	520	562	554	571	577
05 Social Sciences and Psychology	567	612	604	562	551	495	492	538	524	534	550
06 Health Sciences and Services	556	577	577	567	542	506	511	538	519	516	526
07 Education	532	577	573	538	517	490	479	503	497	470	501
08 Business	556	566	583	525	555	503	501	509	514	507	530
09 All Other Fields	556	605	585	555	529	499	496	524	513	508	527
10 Missing	572	603	607	574	545	492	485	504	526	539	547
TOTAL	564	609	608	572	546	505	486	521	518	536	547

Appendix G-3

Sample Detailed Matrix of Undergraduate to Graduate Major, first pages

1993 Table 1
Number of U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	11
01 Mathematics/Statistics	2,291	36	13	36	6	10					
02 Physics/Astronomy	46	1,517	9	7	1	6	1				
03 Chemistry	9	11	1,988	3		38	2		47	2	1
04 Computer Science	243	49	17	2,087	95	19	2		3	1	3
05 Other Computer/Information Sci	95	13	8	268	292	16			2		1
06 Biology	4	2	14	2	1	1,429	9	5	23	4	42
07 Cellular/Molecular Biology	1	6	24			571	257	23	115	2	16
08 Genetics	3	2	6	1		401	31	79	33	1	26
09 Biochemistry	2	1	170			157	6	4	379	1	3
10 Physiology	4	2	6	2		198	3	1	3	51	27
11 Zoology		1	1			255		1	3	2	169
12 Ecology	5	5	1	2		454	3	2	6	1	43
13 Marine Biology	2		4	1	1	397	3	3	2		68
14 Nutrition		1	6			52	1		10	2	3
15 Other Biological Sciences	30	43	116	9	3	1,348	54	10	119	12	102
16 Agriculture/Forestry/Wildlife	12	4	21	4		285	4	7	11	1	38
17 Geology/Geochem/Geophysics/Paleo	7	19	13	4	1	13			1		3
18 Earth/Atmospheric/Marine/Envir Sci	19	35	81	7	2	233	1	1	16	2	21
19 Other Natural Sciences	1	7	5	1		13					1
20 Nursing	5	2	10	2	2	123	1	2	5	4	16
21 Public Health	28	3	44	2	2	273	12	2	14	11	25
22 Veterinary Medicine	14	3	24	1	3	803	6	5	36	35	182
23 Physical Therapy	31	5	43	6	2	1,286	8	3	18	66	92
24 Speech/Hearing/Language Pathology	3	1	1	2		33			1	1	1
25 Other Health and Medical Sciences	45	40	160	8	7	940	28	11	58	15	95
26 Aerospace Engineering	5	30	2	2	1						
27 Biomedical Engineering	10	27	6	6	4	21	2		13	1	2
28 Chemical Engineering	3	5	94		1	4	1		2		1
29 Civil Engineering	51	66	50	4	1	60	3		13		6
30 Electrical Engineering	43	109	4	89	8	2			1		
31 Industrial Engineering	83	17	9	18	8	7	1				
32 Materials Engineering	3	25	22	1		2			1		
33 Mechanical Engineering	21	54	2	1		1				1	1
34 Other Engineering	33	72	13	22	6	12	1				1
35 Anthropology/Archaeology	4	8	2	4		19			3		6
36 Economics	56	3	3	10	7	2					
37 International Relations	7	5	5	5	3	9				1	1
38 Public Policy Studies	9	1	5	4		16	1		2		1
39 Other Political/Government Sci	4	8	6	5	2	10			1		
40 General Psychology	10	3	2	6	1	40			1		2
41 Clinical Psychology	9	3	5	12	3	67	2		2	1	9
42 Counseling Psychology	32	4	2	8	5	38	2		3	1	4
43 Industrial/Organizational Psych	3			1	1	3					
44 Other Psychology	14	2	8	13	4	31			4		2
45 Sociology	7	1	2	5	4	7			1		
46 Geography	8	1	1	3	2	5					
47 Criminal Justice/Criminology	4		8	1	2	9					
48 Other Social Sciences	9	3	3	1	3	12					
49 Drama/Theatre Arts	7		3	1	1	1					
50 Music	3	5	2			1			1		
51 Fine Arts	1		2			1	2				
52 Other Performance/Studio Arts	3		1	1	1	2					
53 Art History and Theory	1		1			5					
54 American Language and Literature	1	2				5	1				
55 English Language and Literature	6	2	1	3	1	8					1
56 Creative Writing	2	1	2	2		11	1		1		1
57 French						1					
58 Spanish	2					2					
59 Other Foreign Language/Literature	4	1		1	1	3			1		1
60 American History	4		3	3		5					
61 European History	1	1		1		3					
62 Other History	6	9	2	2	1	8					1
63 Philosophy	16	11	2	3	1	4			4		1
64 Other Arts and Humanities	12	2	5	4	2	11			2	1	
65 Administrative Education	114	8	11	6	4	92	1		1	1	4
66 Curriculum/Instructional Education	74	8	13	13	3	40		1			5
67 Elementary Education	28	1	3	8	9	23		1	1		4
68 Secondary Education	363	32	49	22	9	190	4	1	8	1	17
69 Special Education	21		3	2	1	21					2
70 Physical Education	7	1		1	1	24			2	2	5
71 Education Research and Evaluation	33	2	5	5	3	12	1		1		3
72 Other Education	155	13	31	48	22	116	1		4	2	17
73 Business Administration/Management	35	9	20	29	17	32	2		2	1	
74 Accounting/Finance/Other Business	35	2	4	29	9	7					
75 Architecture	19	8	3	6	2	6			2		1
76 Other Architecture/Envir Design	4	2	3	5	1	7					3
77 Journalism/Mass Communications	4	3	1	1	2	12			1		2
78 Radio/TV/Film	2	2		3	1	5					2
79 Other Communications	6	2	3	3	3	13			1	1	
80 Home Economics	1		1	1	2	4					
81 Library and Archival Sciences	20	5	11	8	5	18	1			1	2
82 Public Administration	15	5	8	9	9	20		1	1	3	2
83 Religion and Theology	10	3	5	4	4	8	2				2
84 Ordained Ministry and Rabbinate	6	1	2	5	1	5					1
85 Social Work	8	1	1	6	2	19			1	1	
86 Other and Interdisciplinary	26	18	16	21	10	72			2	1	9
87 Missing	896	449	702	401	97	2,132	72	31	199	39	173
TOTAL	5,279	2,864	3,958	3,333	709	12,679	533	194	1,187	273	1,273

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1993 Table 3
Number of Female U.S. Citizens

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	11
01 Mathematics/Statistics	1,026	4	8	8	4	8					
02 Physics/Astronomy	15	276	3		1	1					
03 Chemistry	3	1	765	1		14	1		24	1	1
04 Computer Science	81	2	3	432	26	4			1		
05 Other Computer/Information Sci	27	2	1	75	81	2			1		
06 Biology		1	8	2		829	3	3	10	2	21
07 Cellular/Molecular Biology		1	13			276	99	9	48	1	8
08 Genetics	2	1	3			277	21	46	18		15
09 Biochemistry			99			87	2	1	133	1	2
10 Physiology	3	1	2	1		87	2		2	20	14
11 Zoology		1				155			3	1	74
12 Ecology	4	1		1		212	2	1	1		21
13 Marine Biology			2			224		3	1		35
14 Nutrition		1	6			45	1		6	2	2
15 Other Biological Sciences	14	9	52	5	1	787	22	6	63	4	56
16 Agriculture/Forestry/Wildlife	6	2	6	3		128		3	5		15
17 Geology/Geochem/Geophysics/Paleo	4	7	6	3	1	8					2
18 Earth/Atmospheric/Marine/Envir Sci	11	14	33	2		134		1	8	1	10
19 Other Natural Sciences	1	2	3			7					1
20 Nursing	4	2	9	2	2	104	1	2	4	3	14
21 Public Health	17	1	25	1	1	195	11	1	5	5	13
22 Veterinary Medicine	8	3	19	1	3	593	4	5	18	21	128
23 Physical Therapy	18	4	33	3	1	928	7	2	14	43	64
24 Speech/Hearing/Language Pathology	3	1	1	1		30				1	1
25 Other Health and Medical Sciences	29	9	86	3	4	581	14	8	33	7	41
26 Aerospace Engineering	4	4		1							
27 Biomedical Engineering	4	9	4	2	1	7	1		8		1
28 Chemical Engineering	2	2	30			3	1		1		1
29 Civil Engineering	24	17	21	3		23	1		7		2
30 Electrical Engineering	10	13	1	22	3	1			1		
31 Industrial Engineering	34	4	1	6	4	3					
32 Materials Engineering	2	5	11								
33 Mechanical Engineering	7	7		1							
34 Other Engineering	11	7	6	7	4	3	1				
35 Anthropology/Archaeology	3	2	1	2		11			3		3
36 Economics	16			1	2	2					
37 International Relations	4	1	1		1	4				1	
38 Public Policy Studies	6		1	1		9	1		1		
39 Other Political/Government Sci			2	1	1	5			1		
40 General Psychology	8	1	2	4	1	29			1		1
41 Clinical Psychology	5		3	6	3	49	2		1	1	4
42 Counseling Psychology	21			5	3	24	1		2		2
43 Industrial/Organizational Psych	3			1	1	2					
44 Other Psychology	8		4	4	1	22			3		1
45 Sociology	6		1	1	2	4			1		
46 Geography	5			3		5					
47 Criminal Justice/Criminology			4	1	1	6					
48 Other Social Sciences	7		3	1	2	5					
49 Drama/Theatre Arts	2		2		1	1					
50 Music	2		1			1			1		
51 Fine Arts	1						2				
52 Other Performance/Studio Arts	2					1					
53 Art History and Theory	1		1			5					
54 American Language and Literature	1	1				1					
55 English Language and Literature	5	1		1	1	4					
56 Creative Writing	1		1	1		8			1		1
57 French											
58 Spanish	2										
59 Other Foreign Language/Literature	2			1		3			1		
60 American History	2		1	1							
61 European History						1					
62 Other History	3			1	1	3					1
63 Philosophy	4	1		1		1			1		
64 Other Arts and Humanities	3					7			2	1	
65 Administrative Education	56	1	6	2	1	47	1		1	1	3
66 Curriculum/Instructional Education	51	1	6	8	1	25		1			3
67 Elementary Education	25	1	3	5	6	19		1			4
68 Secondary Education	233	9	27	13	5	112	3	1	8		12
69 Special Education	19		2	2		17					2
70 Physical Education	3					12			2	1	1
71 Education Research and Evaluation	20		3	4	1	10	1				2
72 Other Education	107	5	21	29	9	73	1		2	2	9
73 Business Administration/Management	14		5	10	5	13	1				
74 Accounting/Finance/Other Business	21			10	5	2					
75 Architecture	11	4	1	2	1	4			1		1
76 Other Architecture/Envir Design	1	1	1	2	1	3					3
77 Journalism/Mass Communications	1	2	1	1		8			1		
78 Radio/TV/Film						1					
79 Other Communications	4	1	1	2	1	10					
80 Home Economics	1		1		1	2					
81 Library and Archival Sciences	14	3	9	6	4	16	1			1	2
82 Public Administration	6		3	4	5	9		1		1	
83 Religion and Theology	4	1	2		1	3	1				
84 Ordained Ministry and Rabbinate	1			1		2					1
85 Social Work	6	1	1	5		17			1	1	
86 Other and Interdisciplinary	11	6	9	9	5	49			1	1	6
87 Missing	478	89	337	128	50	1,272	42	20	103	25	98
TOTAL	2,584	546	1,727	866	260	7,695	251	115	554	149	702

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1993 Table 12 (Table 3/Table 1)
Percent of U.S. Citizens Who Are Female

INTENDED GRADUATE MAJOR	UNDERGRADUATE MAJOR 01	02	03	04	05	06	07	08	09	10	11
01 Mathematics/Statistics	44.78	11.11	61.54	22.22	66.67	80.00					
02 Physics/Astronomy	32.61	18.19	33.33		100.00	16.67					
03 Chemistry	33.33	9.09	38.48	33.33		36.84	50.00		51.06	50.00	100.00
04 Computer Science	33.33	4.08	17.65	20.70	27.37	21.05			33.33		
05 Other Computer/Information Sci	28.42	15.38	12.50	27.99	27.74	12.50			50.00		
06 Biology		50.00	57.14	100.00		58.01	33.33	60.00	43.48	50.00	50.00
07 Cellular/Molecular Biology		16.67	54.17			48.34	38.52	39.13	41.74	50.00	50.00
08 Genetics	66.67	50.00	50.00			69.08	67.74	58.23	54.55		57.69
09 Biochemistry			58.24			55.41	33.33	25.00	35.09	100.00	66.67
10 Physiology	75.00	50.00	33.33	50.00		43.94	66.67		66.67	39.22	51.85
11 Zoology		100.00				60.78			100.00	50.00	43.79
12 Ecology	80.00	20.00		50.00		46.70	66.67	50.00	16.67		48.84
13 Marine Biology			50.00			56.42		100.00	50.00		51.47
14 Nutrition		100.00	100.00			86.54	100.00		60.00	100.00	66.67
15 Other Biological Sciences	46.67	20.93	44.83	55.56	33.33	58.38	40.74	60.00	52.94	33.33	54.90
16 Agriculture/Forestry/Wildlife	50.00	50.00	28.57	75.00		44.91		42.86	45.45		39.47
17 Geology/Geochem/Geophysics/Paleo	57.14	36.84	46.15	75.00	100.00	61.54					66.67
18 Earth/Atmospheric/Marine/Envir Sci	57.89	40.00	40.74	28.57		57.51		100.00	50.00	50.00	47.62
19 Other Natural Sciences	100.00	28.57	60.00			53.85					100.00
20 Nursing	80.00	100.00	90.00	100.00	100.00	84.55	100.00	100.00	80.00	75.00	87.50
21 Public Health	60.71	33.33	56.82	50.00	50.00	71.43	91.67	50.00	35.71	45.45	52.00
22 Veterinary Medicine	57.14	100.00	79.17	100.00	100.00	73.85	66.67	100.00	50.00	60.00	70.33
23 Physical Therapy	58.06	80.00	76.74	50.00	50.00	72.16	87.50	66.67	77.78	65.15	69.57
24 Speech/Hearing/Language Pathology	100.00	100.00	100.00	50.00		90.91				100.00	100.00
25 Other Health and Medical Sciences	64.44	22.50	53.75	37.50	57.14	61.81	50.00	72.73	56.90	46.67	43.16
26 Aerospace Engineering	80.00	13.33		50.00							
27 Biomedical Engineering	40.00	33.33	66.67	33.33	25.00	33.33	50.00		61.54		50.00
28 Chemical Engineering	66.67	40.00	31.91			75.00	100.00		50.00		100.00
29 Civil Engineering	47.06	25.76	42.00	75.00		38.33	33.33		53.85		33.33
30 Electrical Engineering	23.26	11.93	25.00	24.72	37.50	50.00			100.00		
31 Industrial Engineering	40.96	23.53	11.11	33.33	50.00	42.86					
32 Materials Engineering	66.67	20.00	50.00								
33 Mechanical Engineering	33.33	12.96		100.00							
34 Other Engineering	33.33	9.72	46.15	31.82	66.67	25.00	100.00				
35 Anthropology/Archaeology	75.00	25.00	50.00	50.00		57.89			100.00		50.00
36 Economics	28.57			10.00	28.57	100.00					
37 International Relations	57.14	20.00	20.00		33.33	44.44				100.00	
38 Public Policy Studies	66.67		20.00	25.00		56.25	100.00		50.00		
39 Other Political/Government Sci			33.33	20.00	50.00	50.00			100.00		
40 General Psychology	80.00	33.33	100.00	66.67	100.00	72.50			100.00		50.00
41 Clinical Psychology	55.56		60.00	50.00	100.00	73.13	100.00		50.00	100.00	44.44
42 Counseling Psychology	65.63			62.50	60.00	63.16	50.00		66.67		50.00
43 Industrial/Organizational Psych	100.00			100.00	100.00	66.67					
44 Other Psychology	57.14		50.00	30.77	25.00	70.97			75.00		50.00
45 Sociology	85.71		50.00	20.00	50.00	57.14			100.00		
46 Geography	62.50			100.00		100.00					
47 Criminal Justice/Criminology			50.00	100.00	50.00	66.67					
48 Other Social Sciences	77.78		100.00	100.00	66.67	41.67					
49 Drama/Theatre Arts	28.57		66.67		100.00	100.00					
50 Music	66.67		50.00			100.00			100.00		
51 Fine Arts	100.00						100.00				
52 Other Performance/Studio Arts	66.67					50.00					
53 Art History and Theory	100.00		100.00			100.00					
54 American Language and Literature	100.00	50.00				20.00					
55 English Language and Literature	83.33	50.00		33.33	100.00	50.00					
56 Creative Writing	50.00		50.00	50.00		72.73			100.00		100.00
57 French											
58 Spanish	100.00										
59 Other Foreign Language/Literature	50.00			100.00		100.00			100.00		
60 American History	50.00		33.33	33.33							
61 European History						33.33					
62 Other History	50.00			50.00	100.00	37.50					100.00
63 Philosophy	25.00	9.09		33.33		25.00			25.00		
64 Other Arts and Humanities	25.00					63.64			100.00	100.00	
65 Administrative Education	49.12	12.50	54.55	33.33	25.00	51.09	100.00		100.00	100.00	75.00
66 Curriculum/Instructional Education	68.92	12.50	46.15	61.54	33.33	62.50		100.00			60.00
67 Elementary Education	89.29	100.00	100.00	62.50	66.67	82.61		100.00			100.00
68 Secondary Education	64.19	28.13	55.10	59.09	55.56	58.95	75.00	100.00	100.00		70.59
69 Special Education	90.48		66.67	100.00		80.95					100.00
70 Physical Education	42.86					50.00			100.00	50.00	20.00
71 Education Research and Evaluation	60.61		60.00	80.00	33.33	83.33	100.00				66.67
72 Other Education	69.03	38.46	67.74	60.42	40.91	62.93	100.00		50.00	100.00	52.94
73 Business Administration/Management	40.00		25.00	34.48	29.41	40.63	50.00				
74 Accounting/Finance/Other Business	60.00			34.48	55.56	28.57					
75 Architecture	57.89	50.00	33.33	33.33	50.00	66.67			50.00		100.00
76 Other Architecture/Envir Design	25.00	50.00	33.33	40.00	100.00	42.86					100.00
77 Journalism/Mass Communications	25.00	66.67	100.00	100.00		66.67			100.00		
78 Radio/TV/Film						20.00					
79 Other Communications	66.67	50.00	33.33	66.67	33.33	76.92					
80 Home Economics	100.00		100.00		50.00	50.00					
81 Library and Archival Sciences	70.00	60.00	81.82	75.00	80.00	88.89	100.00			100.00	100.00
82 Public Administration	40.00		37.50	44.44	55.56	45.00		100.00		33.33	
83 Religion and Theology	40.00	33.33	40.00		25.00	37.50	50.00				
84 Ordained Ministry and Rabbinate	16.67			20.00		40.00					100.00
85 Social Work	75.00	100.00	100.00	83.33		89.47			100.00	100.00	
86 Other and Interdisciplinary	42.31	33.33	56.25	42.86	50.00	68.06			50.00	100.00	66.67
87 Missing	53.35	19.82	48.01	31.92	51.55	59.66	58.33	64.52	51.76	64.10	56.65
TOTAL	48.95	19.06	43.63	25.98	36.67	60.69	47.09	59.28	46.67	54.58	55.15

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